# Chapter 3

# AFFECTED ENVIRONMENT

This chapter identifies the affected environment and focuses on the existing resources and uses that have the potential to be affected by the proposed project. The affected environment is the baseline against which each project alternative is evaluated in terms of impacts to the human environment that would result from its implementation. The following sections endeavor to comprehensively present the human environment that may potentially be affected by the project alternatives, including both natural and physical resources in the area and the relationships of people to these resources (40 CFR 1508.14).

The affected environment discussed in this chapter consists of topography, geology and soils, air quality, water resources, biological resources (including vegetation and wildlife), cultural resources, visual resources, land uses, recreation, travel management, grazing management, special designations, noise, hazardous materials and solid waste, social and economic conditions (including environmental justice), and public health and safety. Relevant environmental conditions and human uses within the analysis area have been identified and described using geographic information system (GIS) data, literature searches, electronic searches, interviews, detailed field surveys, and information from BLM resource specialists.

## 3.1 GENERAL SETTING

The three action alternative and two sub-alternative locations for the proposed Parkway are completely within Maricopa County on 475 to 554 acres of BLM land (acreage is dependent on the action alternative). As described in Table 2-6 in Chapter 2, ASLD and private lands are also included in the alternatives and sub-alternatives. The project area stretches between southern Goodyear and Mobile, Arizona, through Rainbow Valley. The SDNM is directly southwest of the project alternatives. Rainbow Valley is a sparsely populated, undeveloped expanse of land with diverse land ownership, including the BLM, ASLD, and private land owners. Lands in the immediate vicinity of the analysis area are composed of undeveloped, relatively undisturbed desert across a flat, alluvial plain that is dissected by several drainages. Lands outside the SDNM are dominated by creosote flats, although some agricultural use exists in the region. There are several utility corridors in use, which include authorizations such as transmission lines, gas lines, and associated access roads.

### 3.1.1 Resources Values and Uses Brought Forward for Analysis

Based on internal (agency and cooperator) and external (public) scoping, or issue identification, a number of issues and concerns were identified for analysis in this EIS (see Chapter 1, Section 1.7). In order to analyze and respond to the issues and concerns, the resource values and uses of the affected environment must be identified and described. For this EIS analysis, the following resources and uses are brought forward for analysis and are presented in this chapter.

- Air Resources
- Cultural and Heritage Resources
- Paleontological Resources
- Soil Resources
- Vegetation Resources
- Visual Resources
- Water Resources
- Wildland Fire
- Wildlife and Special-Status Species
- Lands and Realty
- Livestock Grazing
- Recreation Management
- Travel Management
- Special Designations
- Noise
- Hazardous Materials and Public Safety
- Social and Economic Conditions

#### 3.1.1.1 Analysis Area

The analysis area varies by resource value or use, depending on the geographic extent of the resource or use and the extent of the effects of the proposed action alternatives on a resource or use. In some cases, the analysis area is the project area (i.e., the 250-foot ROW of each alternative) because that is the anticipated extent of the effects of the project on the resource. In other cases, the analysis area is much larger, encompassing larger administrative or natural boundaries (e.g., Maricopa County or Rainbow Valley), because the effects on the resource extend beyond the project area boundary. The analysis area for each resource value or use is defined at the beginning of each resource section.

## 3.2 AIR RESOURCES

Air quality generally refers to the amount or level of pollutants found in the ambient air. Air pollution is defined as the presence in the atmosphere of natural and artificial substances that affect human health or well-being, or the well-being of any other specific organism. Air pollution also applies to situations in which contaminants impact structures and artifacts or esthetic sensibilities (such as visibility or smell). Pollutants are further defined as primary (emitted directly from a source) or secondary (formed in the atmosphere by reactions of primary pollutants).

### 3.2.1 Applicable Laws, Regulations, and Policies

The Clean Air Act of 1963 (PL 88-206) requires any federal entity engaged in an activity that may result in the discharge of air pollutants to comply with all applicable air pollution control laws and regulations (federal, state, or local). The original act established funding for the study and the cleanup of air pollution and a program for state and local research and control. The CAA was amended in 1965, 1967, 1970, 1977, and most recently in 1990.

The 1965 amendments established motor vehicle emissions standards. The 1967 amendments expanded the role of the federal government by establishing multi-state air quality control regions and initiating enforcement proceedings for interstate pollution control. The 1970 amendments (PL 91-604) required the attainment and maintenance of NAAQS for six different criteria pollutants: CO, $O_3$, PM, sulfur oxides, oxides of nitrogen, and lead. The amendments also established National Emissions Standards for Hazardous Air Pollutants and directed states to develop SIPs for attaining and maintaining the NAAQS. The 1977 amendments required the EPA to review the NAAQS every 5 years and update the standards for each criteria pollutant, as necessary. The amendments also mandated the prevention of significant deterioration within each designated attainment area, primarily to regulate point sources of air pollutants, such as smoke stack exhaust from power plants and industrial process facilities. Finally, the 1977

amendments established the Conformity Rule, which prohibits the participation of any federal agency in activities that do not meet the goals of the applicable SIP.

The most recent amendments to the CAA were promulgated in 1990 (PL 101-549). These amendments significantly increased the regulatory authority of the federal government and addressed the problems caused by smog and acid rain. The amendments established new and stricter standards for motor vehicle emissions, 1995 models and newer, and listed 188 air toxics or hazardous air pollutants. Title I, Part D, Section 176(c) of the 1990 CAA amendments expands on the 1977 CAA Conformity Rule:

> No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan after it has been approved or promulgated under section 110. No metropolitan planning organization designated under Section 134 of Title 23, United States Code, shall give its approval to any project, program, or plan which does not conform to an implementation plan approved or promulgated under Section 110…conformity to an implementation plan means—(a) conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and (b) that such activities will not (i) cause or contribute to any new violation of any standard in any area; (ii) increase the frequency or severity of any existing violations of any standards in any area; (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The conformity process provides the nexus between the federal regulation of criteria pollutants and state and local implementation of the federal standards. The SIP is an enforceable plan developed at the state and local level to comply with the NAAQS. States such as Arizona with air quality control regions that fail to meet or satisfy the NAAQS must submit their SIP to the EPA. The SIP is generally not a single document but rather a cumulative record of all air pollution strategies, state statutes, control strategies, state and local rules, and local ordinances aimed at attaining the NAAQS within each air quality control region. The Arizona SIP, originally drafted in 1972, includes all subsequent state transportation improvement plans, regional transportation plans, and other metropolitan planning organization transportation improvement plans.

The MAG Regional Transportation Plan (2010) indicated a need to establish a major arterial road (or Parkway) corridor to meet future needs in the newly annexed portion of the MPA. The City General Plan Amendment (City 2007) intends to deliver a means of access to core areas of the city of Goodyear and the greater Phoenix metropolitan area for timely emergency services (police, fire, ambulance) to newly annexed portions of the City. The City annexed a 67–square mile area within its 95–square mile MPA to accommodate the Sonoran Valley Parkway for this purpose and to provide a connection between the community of Mobile and the city. Because the analysis area for the proposed SVPP lies within the boundaries of non-attainment and maintenance areas for one or more criteria pollutants, conformity must be demonstrated prior to the selection and construction of an alignment for the action alternative unless the No Action Alternative is selected. The scope of design elements for the action alternative must be consistent with the approximately 15- to 18-mile-long, two-lane Parkway proposed in the City General Plan Amendment, and the requirements of Title I, Part D, Section 176(c) of the 1990 CAA amendments must be satisfied.

The Arizona Administrative Code (AAC) Title 18, Environmental Quality, Chapter 2, Department of Environmental Quality, Air Pollution Control, Section R18-2-614, effective July 18, 2005, prohibits visible dust emissions with opacity greater than 40% from any non-point source measured in accordance with the Arizona Testing Manual, Reference Method 9. In addition to rule R18-2-614, several additional

rules also require control of visible dust from open areas, road construction, material handling, storage piles, Parkway, and site clearing. These rules are outlined in Table 3-1.

**Table 3-1.** Applicable Air Quality Rules

| Rule Number | Rule Description |
|---|---|
| R18-2-604 | Construction on "open areas'" fugitive dust limitations |
| R18-2-605 | Road construction fugitive dust limitations |
| R18-2-606 | Material handling fugitive dust limitations |
| R18-2-607 | Storage pile fugitive dust limitations |
| R18-2-614 | Opacity limitation for non-point sources |
| R18-2-702 | Visible emission limitations |
| R18-2-802 | Off-road machinery opacity limitations |
| R18-2-805 | Roadway and site-clearing opacity limitations |

In addition to statewide rules governing emissions from construction, Maricopa County has outlined measures in the Maricopa County Air Quality Rules (MCAQR) to be incorporated into construction specifications to minimize potential dust emissions. Rules 310 and 310.01 (both revised in January 2010) of the MCAQR include work practice standards to ensure that emissions from fugitive dust sources, such as open areas, vacant lots, unpaved parking lots, and unpaved roadways, are minimized to the extent practicable. Under MCAQR Rule 310, the owner and/or operator of any dust-generating operation is required to conduct the following:

- Obtain a Maricopa County Air Quality Division (MCAQD) Dust Control Permit for all projects that will disturb more than 0.1 acre (4,356 square feet) of soil prior to beginning construction (Rule 310, Section 401).
- Submit to the Control Officer a dust control plan for approval with any application for a Dust Control Permit. Applicants shall describe, in a dust control plan, all control measures to be implemented before, after, and while conducting any dust-generating operation, including on weekends, after work hours, and on holidays (Rule 310, Section 402).
- For all areas with a Dust Control Permit that are larger than 5 acres, the owner and/or operator shall erect and maintain a project information sign (Rule 310, Section 308).
- Comply with the Dust Control Training Requirements (Rule 310, Section 309).
- For any site of 5 acres or more of disturbed surface area, at least one Dust Control Coordinator must be present at all times during primary dust-generating operations (Rule 310, Section 310).
- Implement contingency dust control measures when primary control measures are ineffective (Rule 310, Section 305).
- Require the owner/operator to maintain a daily written log recording the actual application or implementation of the control measures described in the approved dust control plan (Rule 310, Section 502).

### 3.2.2 Analysis Area

Typically, the analysis area for assessing air quality impacts of a future Parkway alignment is defined by the location of areas of frequent and extended exterior use, such as sidewalks, trails, bus and transit stops,

and in some cases residential backyards located adjacent to the proposed ROW for the project, especially in urban areas. For projects in rural settings, an acceptable approach to establishing the affected environment and assessing future environmental consequences is to include areas of frequent and extended exterior use that are located within 1,000 feet of the proposed ROW. Figure 3-1 shows the 1,000-foot perimeter around the 250-foot-wide ROW for each of the proposed action alternatives. Because of the sparse development in the analysis area, only four areas of potential frequent and extended exterior use are located within the 1,000-foot perimeter: three residences (one east of Bullard Avenue, one south of Patterson Road, and one north of Powhattan Road) and one park (the eastern boundary of the SDNM). Therefore, the analysis area is more appropriately set at the perimeter of each 1-mile section crossed by each of the three alignment alternatives.

## 3.2.3 Air Quality Conditions

The analysis area lies within the Salt River valley, a broad, oval, nearly flat plain surrounded by mountains. This area is characterized by extremely hot summers, mild winters, low annual rainfall, and a stable wind environment.

### *3.2.3.1 Temperature and Precipitation Data*

A summary of historical temperature and precipitation data collected by the National Climatic Data Center weather station nearest the analysis area (Station #021026 in Buckeye, Arizona) is presented in Table 3-2. The historical average monthly temperature varies from a maximum of 107 degrees Fahrenheit (°F) in July to a minimum of 35°F in January. Precipitation averages approximately 8 inches per year. From November through March, storm systems from the Pacific Ocean cross the state. In the summer, rainfall begins in July and lasts until mid-September as a result of moisture-bearing winds from the Gulf of Mexico. Snowfall in the area is rare, with most accumulation occurring in higher mountains of the central and northern parts of the state.

**Table 3-2.** Summary of Climatology Data for Buckeye, Arizona

| Month | Temperature (°F) | | | Precipitation (inches) | |
|---|---|---|---|---|---|
| | Average* | Average Monthly Maximum* | Average Monthly Minimum* | Average* | Historical Monthly Maximum* |
| January | 51.22 | 67.8 | 34.6 | 0.82 | 4.30 |
| February | 55.45 | 72.5 | 38.4 | 0.78 | 6.46 |
| March | 60.43 | 78.4 | 42.4 | 0.75 | 3.88 |
| April | 67.50 | 86.6 | 48.4 | 0.28 | 2.07 |
| May | 75.45 | 95.0 | 55.8 | 0.10 | 1.34 |
| June | 84.15 | 104.2 | 64.0 | 0.07 | 1.45 |
| July | 90.74 | 107.1 | 74.4 | 0.87 | 4.10 |
| August | 89.39 | 105.2 | 73.6 | 1.13 | 6.89 |
| September | 83.04 | 100.8 | 65.3 | 0.77 | 5.00 |
| October | 70.94 | 89.9 | 52.0 | 0.50 | 3.10 |
| November | 58.83 | 76.9 | 40.9 | 0.62 | 5.01 |
| December | 51.56 | 68.1 | 35.0 | 0.90 | 4.68 |
| Annual | 70.08 | 87.7 | 52.1 | 7.70 | 21.80 |

Source: Western Regional Climate Center (2008).

* National Climatic Data Center period of record for Buckeye, Arizona: 1893–2003.

Meteorology directly affects air quality through the transport and dispersion of pollutants. Important factors include the speed and direction of surface winds, atmospheric stability, temperature inversion, solar insolation, and mixing depth.

#### 3.2.3.2 Wind

For the Phoenix metropolitan area, the historical average wind speed recorded during this period is 5.21 knots (6 mph), and prevailing winds are to the east between January to August and to the west between September and December. Figure 3-2 is a wind distribution graph (wind rose plot) of wind speed vs. direction recorded at Phoenix Sky Harbor International Airport for the years 1961 to 1992 (WebMET 2008). Because local terrain can affect wind distributions, these historical data should be viewed only as a general indication of wind patterns in the analysis area.

Stability is defined as the tendency of the atmosphere to resist or enhance vertical motion. Stability is related to both the change of temperature with height in the atmosphere and wind speed. Stability is an indication of the ability of the atmosphere to promote vertical mixing of the air and, as a result, the mixing and diffusion of pollutants.

A stable atmosphere inhibits mechanical turbulence, an unstable atmosphere enhances mechanical turbulence, and a neutral atmosphere does not enhance or inhibit turbulence. A common method for determining atmospheric stability involves classification of different meteorological conditions characterized by wind speed and net solar radiation (during the day) and cloud cover during the night.

These stabilities are reported in terms of Pasquill-Gifford Stability Classes. These classes identify six gradations of stability, ranging from an extremely unstable condition, Stability Class A, to an extremely stable condition, Stability Class F. Classes B–E represent unstable, slightly unstable, neutral, and stable conditions, respectively. Stability Class A is the most conducive to diffusion; Class F represents the poorest diffusion conditions.

Stability data are not available for the analysis area. Historical data from the Phoenix Sky Harbor International Airport give an indication of stability conditions in the general area. These stabilities were determined using the Pasquill-Gifford method during the period from 2000 to 2005. Stability Classes A through D occurred approximately 60% of the time; Classes E and F occurred approximately 40% of the time (Western Regional Climate Center 2006).

## 3.2.4 National Ambient Air Quality Standards

Based on the adopted air quality standards, the CAA requires that states classify air basins (or portions thereof) as either *attainment* or *nonattainment* with respect to the criteria pollutants. The classifications are defined below.

- **Attainment Area:** This is a geographic or politically delineated air basin that meets the NAAQS for criteria pollutants.
- **Nonattainment Area:** This is a geographic or politically delineated air basin that does **not** meet the NAAQS for one or more pollutants. Nonattainment areas/states are required to formulate and submit SIPs to the EPA that outline the measures the state will implement to attain and maintain the NAAQS.
- **Serious Nonattainment Area:** All $PM_{10}$ nonattainment areas were initially classified as moderate and were assigned an attainment date of December 31, 1994. A *moderate* nonattainment area can subsequently be reclassified as a *serious* nonattainment area if the EPA determines that the area

cannot "practicably" attain the $PM_{10}$ NAAQS by the attainment date, or, following the passage of the original attainment date, if the EPA determines that the area has failed to attain the standard. The Maricopa County nonattainment area was reclassified as *serious* on May 10, 1996, because of a failure to attain the particulate standard by December 31, 1994.

- **Unclassifiable:** This is an area that lacks sufficient monitoring data. Unclassifiable areas are conservatively managed as though they are in attainment in order to maintain or improve existing air quality.
- **Maintenance Area:** This is an area that was previously classified as a nonattainment area and that has been demonstrated with recent data to have achieved attainment of the NAAQS.

A particular geographic region may be classified as an attainment area for some pollutants and as a nonattainment area for others. The Arizona Department of Environmental Quality (ADEQ) has designated all of Maricopa County as being either in attainment or unclassifiable with respect to the NAAQS for sulfur dioxide ($SO_2$) and nitrogen dioxide ($NO_2$). Progress in regional air quality improvement in recent years has allowed the county to be designated a maintenance area with respect to CO and 1-hour $O_3$ NAAQS. In contrast, most of Maricopa County is a serious nonattainment area for $PM_{10}$. Further, the ADEQ and EPA have designated nearly all of Maricopa County to be in nonattainment for the more recent NAAQS for 8-hour average $O_3$ and for both short- and long-term NAAQS for $PM_{2.5}$ (Figure 3-3).

In July 1997, the EPA tightened standards for $PM_{10}$, added standards for $PM_{2.5}$, and revised the method for determining an exceedance (*Federal Register* 62:38421). In January 2006, the EPA again proposed revising the NAAQS for PM (*Federal Register* 71:2620). The revisions included reducing the 24-hour standard for $PM_{2.5}$ from 65 micrograms per cubic meter ($\mu g/m^3$) to 35 $\mu g/m^3$ and eliminating the annual standard for $PM_{10}$. The NAAQS for particulates and the other five criteria pollutants are presented in Table 3-3.

**Table 3-3.** National Ambient Air Quality Standards

| Pollutant | Averaging Time | Primary Standard $\mu g/m^3$ (ppm)* | Secondary Standard $\mu g/m^3$ (ppm) |
|---|---|---|---|
| CO | 1-hour | 40 (35) | N/A |
| | 8-hour | 10 (9) | N/A |
| $NO_2$ | Annual | 100 (0.05) | 100 (0.05) |
| $O_3$ | 1-hour† | (0.12) | (0.12) |
| | 8-hour | (0.075) | (0.075) |
| $PM_{10}$ | 24-hour | 150 | 150 |
| | Annual‡ | 50 | 50 |
| $PM_{2.5}$ | 24-hour | 65 | 65 |
| | Annual | 15 | 15 |
| $SO_2$ | 3-hour | N/A | 1,300 (0.5) |
| | 24-hour | 365 (0.14) | N/A |
| | Annual | 80 (0.03) | N/A |
| Lead | Calendar quarter | 1.5 | 1.5 |

Source: 40 CFR 50

* ppm = parts per million

† 1-hour standard revoked on June 15, 2005, in Arizona

‡ Annual standard eliminated in January 2006

## 3.2.5 Particulate Matter

PM is a collective term used to describe very small solid or liquid particles that vary considerably in size, geometry, chemical composition, and physical properties. Particulates contribute to visibility reduction, pose a threat to public health, and cause economic damage through soil disturbance. Health effects of particulates are determined by their size, shape, and chemical composition. Particles larger than 10 microns are deposited in the upper respiratory tract, particles from 2.5 to 10 microns ($PM_{10}$) are inhaled and deposited in the upper parts of the respiratory system, and particles smaller than 2.5 microns ($PM_{2.5}$) are deposited in the pulmonary tissues during exhalation.

Particles in the size range of 0.1 to 2.5 microns are most efficiently deposited in the alveoli, where their effective toxicity is greater than larger particles because of the higher relative content of toxic heavy metals, sulfates, and nitrates. Human health studies have shown causal relationships between particulates and excess mortality, aggravation of bronchitis, and small reversible changes in pulmonary function in children. Acidic aerosols have been linked to the inability of the upper respiratory tract and pulmonary system to remove harmful particles.

PM is produced by natural processes (wind erosion and pollen) and human activity. Coarse particulate emissions are mostly geological and are the result of three activities: the steady grinding (re-entraining) of dust from paved roads, driving on unpaved roads, and earth moving associated with construction. Soil dust from these sources and others contributes more than 70% of the coarse particulates in Phoenix. In other urban and rural areas, this mixture of sources will vary. Agricultural and mining areas, for example, will be more heavily influenced by emissions from these activities. On days with winds in excess of 15 mph, wind erosion of soil primarily contributes to emission levels.

Fine particulate ($PM_{2.5}$) emissions have a more diverse chemical composition and are produced by a larger number of sources in comparison to coarse particles. ADEQ receptor modeling in central Phoenix indicates gasoline and diesel engine exhaust account for more than two-thirds of the $PM_{2.5}$ emissions. Soil dust contributes another 10.5%. $PM_{2.5}$ concentrations are typically higher in the central portions of urban areas and diminish to background concentrations on the urban fringe. $PM_{10}$ concentrations depend on the location of activities that generate them and have a greater spatial variation than $PM_{2.5}$; however, background concentrations tend to be about 40% of urban concentrations. Concentration of particulates in both size ranges are higher in the late fall and winter, when atmospheric dispersion is seasonally low. On a daily basis, particulate concentrations typically peak during hours of worst dispersion, which is from sunset to midmorning.

The Phoenix $PM_{10}$ nonattainment area is an approximately 48 × 60–mile rectangular section of eastern Maricopa County plus a 6 × 6–mile section of Pinal County that includes the city of Apache Junction. The portion of Pinal County included in the non-attainment is Western Pinal County at the county line separating Pinal and Maricopa Counties (see Figure 3-3). The north end of each of the proposed SVPP alignment alternatives lies within the boundaries of the nonattainment area (see Figure 3-3). $PM_{10}$ exceedances within the designated area occur primarily during stagnant, wintertime, morning conditions. The nonattainment area was initially classified as “moderate,” effective November 15, 1990. In 1996, the EPA issued a Final Rule that reclassified the nonattainment area for $PM_{10}$ from “moderate” to “serious;” the effective date of this reclassification was June 10, 1996 (*Federal Register* 61:21372).

On April 13, 2000, the EPA proposed to approve provisions of the Revised MAG 1999 Serious Area Particulate Plan for the Maricopa $PM_{10}$ non-attainment area and grant Arizona’s request to extend the CAA deadline for attaining the annual $PM_{10}$ standard in the Phoenix area from 2001 to December 31, 2006 (*Federal Register* 72:65752). The EPA published a Final Rule on July 25, 2002, approving the Revised MAG 1999 Serious Area Particulate Plan for $PM_{10}$, including the request to extend the

attainment date. On June 6, 2007, EPA published in the *Federal Register* (72:31183) a Finding of Failure to Attain the $PM_{10}$ standard by this deadline for Maricopa County. As a requirement of the Finding, MAG (2007c) submitted the *MAG 2007 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2007b) in December 2007. The report is a SIP revision to provide for attainment and 5% annual reductions in $PM_{10}$ or $PM_{10}$ precursor emissions until attainment is achieved, as required by CAA Section 189(d). The EPA published a notice of partial approval and partial disapproval of the MAG 2007 Plan on September 9, 2010. As a result, ADEQ voluntarily withdrew the MAG 2007 Plan on January 25, 2011. A new SIP revision, titled *MAG 2012 Five Percent Plan for PM-10 for the Maricopa County Nonattainment Area* (MAG 2012) was submitted in May of 2012 to address the deficits identified by the EPA in the former plan. Although the SIP (which includes the non-attainment portions of Pinal County) has not been approved, its final requirements may be impacted by the SVPP and it is therefore included in the analysis.

Control measures such as Rules 310 and 310.01 of the MCAQR mainly target construction and maintenance operations known to generate particulates, although primary (freeway and major arterial) and secondary (collector) paved roads are included in the measures. On August 21, 2007, the EPA published in the *Federal Register* (72:43537) a Final Rule effective September 20, 2007, approving 77 Maricopa County rules and measures as best available control measures and most stringent measures. Efforts to reduce dust re-suspended from paved roads have concentrated on eliminating trackout from construction sites, curbing and stabilizing road shoulders, and investigating more efficient street sweepers. Secondary fine particulates have been reduced by vehicular emission controls, which have reduced their precursor gases, and by diesel engine replacement and retirement programs.

### 3.2.6 Carbon Monoxide

CO is produced in the incomplete combustion of fuels and vehicular emissions are a major source. About half of the CO emissions in Arizona's metropolitan areas come from on-road motor vehicles. A little less than half of the CO emissions come from off-road vehicles, construction equipment, and lawn and garden equipment. The remaining CO emissions come from point and area sources.

CO has low background levels, with the highest concentrations occurring next to busy streets, and elevated neighborhood concentrations in locations with significant amounts of emissions transported from upwind areas. CO concentrations peak from November to January because emissions are highest in cold weather, vehicle emissions vary inversely with temperature, and the surface layer of the atmosphere is most stable in wintertime. Hourly concentrations tend to be at their maximum during the morning rush hour and between 6 p.m. and midnight.

The analysis area lies within the current boundaries of the Phoenix CO Maintenance Area (see Figure 3-3). The Phoenix area was initially classified as a "moderate" nonattainment area, effective November 15, 1990. On September 22, 2003, the EPA found that the Phoenix metropolitan nonattainment area had attained the NAAQS for CO by the December 31, 2000, deadline; the Phoenix area had not had an exceedance of the standards since 1996. On March 9, 2005, the EPA approved the MAG Serious Area CO SIP and the MAG CO Redesignation Request and Maintenance Plan for the nonattainment area.

Controls have reduced CO emissions, and the standards have been achieved in metropolitan Phoenix over the past 15 years, in direct contrast to the first half of the 1980s, when more than 100 exceedances were recorded each year. Equipping vehicles with catalytic converters and electronic ignition systems has been the most effective control, and significant reductions can be attributed to the vehicle emissions inspection program (beginning in 1976) and oxygenated fuels (beginning in 1989).

## 3.2.7 Ozone

$O_3$ is a colorless, slightly odorous gas that increases respiratory rates, pulmonary resistance, and affects lung mechanics. In the stratosphere, $O_3$ blocks harmful ultraviolet radiation. In the urban atmosphere, its formation leads to concentrations harmful to people, animals, plants, and materials. $O_3$ is formed from the photochemical reaction (under sunlight) of volatile organic compounds (VOCs) and $NO_x$. Anthropogenic sources of $O_3$ precursors include vehicle emissions, motorized equipment, power plants, and service stations.

In 1979, the EPA lowered the level of the $O_3$ compliance standard from 0.12 to 0.08 parts per million (ppm). In July 1997, the method for the determining an exceedance was also revised by replacing the 1-hour standard with an 8-hour standard of 0.08 ppm. This standard was further revised in March 2008 with an 8-hour standard of 0.075 ppm.

The Phoenix metropolitan area was previously designated as non-attainment for the 1-hour standard and classified as "moderate" (*Federal Register* November 6, 1991). On May 19, 2000, the EPA proposed to determine that the Phoenix metropolitan serious $O_3$ nonattainment area has attained the 1-hour standard deadline required by the CAA (*Federal Register* May 19, 2000). The 1-hour $O_3$ standard was officially declared attained on May 16, 2001 (ADEQ 2004). On March 21, 2005, the EPA proposed to approve Arizona's request to redesignate the Phoenix metropolitan 1-hour $O_3$ non-attainment area to attainment.

On April 15, 2004, the EPA designated the greater Phoenix area, a large portion of Maricopa County, and a smaller portion of Pinal County as non-attainment for 8-hour $O_3$. At the same time the nonattainment area was classified as "marginal;" classification types are based on the ambient levels. Submittal to the EPA of a SIP to attain the 8-hour standard and demonstrate attainment by June 15, 2009, was required by June 15, 2007. MAG developed a plan for the designated area and submitted it to ADEQ on June 12, 2007. ADEQ submitted it to EPA on June 14, 2007, with the understanding that it would have to be supplemented after EPA responds to a court remand of its Phase I Implementation Rule (*South Coast Air Quality Management District, et al. v. U.S. EPA*, No. 04-1200, issued December 22, 2006).

On April 30, 2012, the EPA issued a final rule revoking the 1997 $O_3$ standard and implementing the proposed 2008 8-hour standard for $O_3$ of 0.075 ppm. The Phoenix-Mesa area continued the 2004 classification designation of marginal non-attainment. A SIP Plan revision, tentatively titled *Eight-Hour Ozone Plan for the Maricopa Nonattainment Area (2008 Standard)*, is pending from the MAG.

Controls to reduce the precursors of $O_3$ have been successfully implemented for years. $NO_x$ and VOCs from vehicular exhaust have been reduced through engine modifications and three-way catalytic converters. Evaporative hydrocarbons (HCs) from vehicles have been reduced through better engineered fuel tanks and auxiliary plumbing combined with carbon absorption canisters. Additional reductions of vehicular VOCs have come through the ADEQ vehicle emissions inspection program, which tests all gasoline fueled vehicles for HCs in Phoenix and Tucson, through vapor capturing equipment for gasoline tankers, vapor recovery systems at retail gas stations (Phoenix area only), and cleaner burning gasoline (Phoenix area only).

## 3.2.8 Other Criteria Pollutants

$NO_2$ is a gas with a yellowish orange to reddish brown appearance that impairs respiratory system functioning, reduces visibility, and contributes to the photochemical formation of $O_3$ in the environment. In the Phoenix area, vehicular emissions are the dominant source of this pollutant, with major contributions from power plants (ADEQ 2008a). $SO_2$ is a colorless gas with a strong, irritating odor at high concentrations that affects the mechanical function of the upper airway, especially the nasal

passages. In Arizona, the principal source of $SO_2$ is smelting of sulfide copper ore (ADEQ 2008a). Other sources are the combustion of sulfur-containing fuels by vehicles and power plants. Lead and its compounds damage the cardiovascular, renal, and nervous systems. Sources of lead include lead-based paint, water from lead pipes, household dust and soil that come in contact with lead, and vehicular emissions associated with the use of leaded gasoline. The Phoenix metropolitan area is in attainment for these remaining criteria pollutants.

## 3.2.9 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates hazardous air pollutants. A hazardous air pollutant, also known as an "air toxic," is a pollutant that is reported to have the potential to adversely affect human health. Air toxics are primarily in gaseous form, but some occur in the atmosphere as particles or liquid droplets. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the CAA.

The EPA has assessed this expansive list of toxics and selected a group of 21 toxics that it considers MSATs. In 2002, the agency extracted a subset of this list of 21 that were considered to have the greatest impact to human health and developed what the EPA now labels the six priority MSATs: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Others are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA and the Federal Highway Administration (FHWA) are funding ongoing research into the contribution of MSATs to ambient levels and the development of analytical methods to forecast future emissions. The EPA is the lead federal agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (*Federal Register* 66:17229) on March 29, 2001, pursuant to Section 202 of the CAA.

In its rule, the EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline program, its national low emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA predicts that even with a 64% increase in vehicle miles traveled, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57% to 65% and will reduce on-highway diesel PM emissions by 87%, as shown in Figure 3-4.

The EPA issued a final rule on February 26, 2007, to control the emission of hazardous air pollutants from mobile sources (*Federal Register* 72:8428). Controls on gasoline, passenger vehicles, and portable fuel containers (primarily gas cans) are being adopted that will significantly reduce mobile source emissions of benzene and other hazardous air pollutants. The benzene content of gasoline will be limited to an annual refinery average of 0.62% by volume (currently 1.0% by volume), beginning in 2011. In addition, for gasoline, the final rule establishes a maximum average standard for refineries of 1.3% by volume beginning on July 1, 2012, which acts as an upper limit on gasoline benzene content when credits are used to meet the 0.62% by volume standard.

The rule also limits exhaust emissions of non-methane hydrocarbon, which include many MSATs, such as benzene, from new passenger vehicles when they are operated at temperatures colder than 75°F. This standard will be phased in from 2010 to 2015. For passenger vehicles, the EPA is adopting evaporative emissions standards that are equivalent to those currently in effect in California.

Finally, EPA is adopting an HC emissions standard for portable fuel containers beginning in 2009 that will reduce evaporation and spillage of gasoline from these containers. These controls will significantly reduce emissions of five of the six priority MSATs (excluding diesel PM), as well as naphthalene.

As a result of the new fuel benzene standards and HC standards for vehicles and portable fuel containers, the EPA expects a reduction in total emissions of air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. In 2030, it is anticipated that passenger vehicles will emit 45% less benzene, gas cans will emit almost 80% less benzene, and gasoline will have 38% less benzene overall. Mobile sources were responsible for more than 70% of benzene emissions in 1999. The reductions in MSATs emissions will reduce exposure and predicted risk of cancer and non-cancer health effects, including environments where exposure and risk may be highest, such as near roads, in vehicles, and in homes with attached garages.

In addition, the HC reductions from the vehicle and gas can standards will reduce VOC emissions (which are precursors to $O_3$ and $PM_{2.5}$) by more than 1.1 million tons in 2030. The vehicle standards will reduce direct $PM_{2.5}$ emissions by more than 19,000 tons in 2030 and will also reduce secondary formation of $PM_{2.5}$. Once the regulation is fully implemented, the EPA estimates that these PM reductions will prevent nearly 900 premature deaths annually.

## 3.2.10 Ambient Criteria Pollutant Levels in the Analysis Area

The MCAQD and the ADEQ maintain a network of air quality monitoring sites throughout Maricopa County; the majority of these sites are located in Phoenix and the surrounding communities. Monitoring sites are not necessarily identical; some may only monitor one or two of the criteria pollutants.

CO is monitored continuously with nondispersive infrared instruments that are deployed in urban neighborhoods and near busy roadways or intersections. In 2008, 14 monitors were in operation in greater Phoenix. Ultraviolet absorption instruments monitor $O_3$ continuously in urban neighborhoods for population exposure, areas downwind of urban areas for maximum concentration, and remote areas for background concentrations. In 2008, 42 reporting $O_3$ monitors were in operation throughout the state.

The most recent NAAQS monitoring data are reported in the *2009 Air Quality Annual Report* (ADEQ 2009a). Ambient concentrations of four criteria pollutants (CO, $NO_2$, $O_3$, and $PM_{10}$) are monitored at one location that is relatively close to the analysis area. MCAQD Buckeye Site (#21525) is located east of Maricopa County Road (MC) 85 and south of Monroe Avenue in Buckeye, Arizona. A summary of the most recent monitoring data collected at this site for CO, $O_3$, and $PM_{10}$ is presented in Table 3-4; CO and $O_3$ are measured in ppm, whereas $PM_{10}$ is measured in $\mu g/m^3$. This is a different station but in the same general location as the National Climatic Data Center weather station, although the MCAQD site does also record weather data. Because the Phoenix metropolitan area and the analysis area are in attainment for $NO_2$, the monitoring data for this criteria pollutant are not presented in Table 3-4.

As shown in the table, there were no exceedances of the NAAQS for CO or $O_3$ at the MCAQD monitoring site (see Figure 3-3). Compliance with the CO 1-hour and 8-hour standards is demonstrated because the highest of the second-highest monitored value in a given year for the most recent 2-year period (2006–2007) does not exceed the primary and secondary standards. The 1-hour and 8-hour CO compliance values from this monitor of 1.6 and 0.8 ppm, respectively, are well below the 1-hour and 8-hour CO NAAQS of 35 and 9 ppm, respectively.

Compliance with the $O_3$ standard is demonstrated because the 3-year average (2006–2008) of the annual fourth-highest monitored daily maximum 8-hour average concentration is less than the primary and secondary standards. The annual fourth-highest 8-hour $O_3$ value was 0.067 ppm in 2006, 0.064 ppm in 2007, and 0.068 ppm in 2008. The 3-year average of these annual fourth-highest 8-hour $O_3$ values of 0.066 is well below the 0.075 ppm 8-hour standard at this location.

**Table 3-4.** Carbon Monoxide, Particulate, and Ozone Monitoring Data (2006–2008)

| Location* | Pollutants | Averaging Time | Average Concentration (ppm or µg/m$^3$) | Compliance Value | Number of Exceedances (for site) |
|---|---|---|---|---|---|
| Buckeye (26449 West 100th Drive) | CO | 1 hour | 1.6† | 1.6† | 0 |
| | | 8 hours | 0.8† | 0.8† | 0 |
| | $PM_{10}$ | 24 hours | (230)‡ | 3§ | 9 (3)¶ |
| | | Annual | (50)** | 50** | 0 |
| | $O_3$ | 8 hours | 0.066†† | 0.066†† | 0 |

Note: Bold values indicate exceedance of the NAAQS for the listed criteria pollutant.

* Operated by MCAQD.

† Value represents the highest of the second-highest monitored value over the most recent 2-year period (2007–2008).

‡ Value represents the 3-year average of the highest yearly value over the most recent period (2006–2008).

§ Compliance value listed represents the 3-year average (2006–2008) expected rate of exceedances.

¶ Estimated number of exceedances of the NAAQS for this criteria pollutant for all three monitoring years (2006–2008), with the average estimated number of exceedances per year in parentheses.

** Value represents the 3-year average over the most recent period (2006–2008); as the annual NAAQS was eliminated in 2006, the compliance value is being compared with the historical standard.

†† Value represents the 3-year average of the annual fourth-highest monitored value over the most recent period (2006–2008).

$PM_{10}$ data at the Buckeye station were collected using the tapered element oscillating microbalance instrument method. To demonstrate compliance with the $PM_{10}$ 24-hour standard, the maximum 24-hour monitored average must not exceed the primary and secondary standards of 150 µg/m$^3$ more than once per year averaged over any 3 consecutive years. The monitored maximum 24-hour average ambient $PM_{10}$ concentration at this station was 272 µg/m$^3$ in 2006, 195 µg/m$^3$ in 2007, and 223 µg/m$^3$ in 2008. These exceedances represent expected annual exceedances of 3.0 in 2006, 2.0 in 2007, and 4.0 in 2008, for an average of 3.0 expected exceedances per year for the 2006 to 2008 period. Therefore, this station has recorded more than an average of one expected exceedance per year averaged over any consecutive 3-year period and is in violation of the 24-hour standard.

The annual NAAQS for $PM_{10}$ was eliminated in 2006; therefore, the monitoring data from the Buckeye station are compared against the historical primary and secondary annual $PM_{10}$ standard of 50 µg/m$^3$, averaged over any consecutive 3-year period. The monitored average annual ambient $PM_{10}$ concentration at this station was 53.0 µg/m$^3$ in 2006, 52.5 µg/m$^3$ in 2007, and 43.2 µg/m$^3$ in 2008, for a 3-year average value of 50 µg/m$^3$. Based on this 3-year average $PM_{10}$ compliance value, this station is in compliance with the historical annual primary and secondary $PM_{10}$ standard.

# 3.3 CULTURAL AND HERITAGE RESOURCES

Cultural resources are defined as specific locations of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. The term includes archaeological, historic, and architectural sites and structures, as well as places with traditional cultural or religious importance within a social or cultural group.

## 3.3.1 Applicable Laws, Regulations, and Policies

The proposed project is subject to a number of laws, regulations, and/or policies implemented by the federal government. As discussed in Chapter 1, decisions on the use and management of BLM lands is guided by FLPMA (43 USC 1701–1784), which requires that "public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values." Therefore, protection of cultural resources on public lands, which includes BLM land, is to be considered by the BLM for most proposed projects. Several acts and policies specific to cultural resources must also be taken into account for the proposed project. These include the following:

- American Antiquities Act of 1906, which protects archaeological sites and objects of antiquity on federal lands;
- Historic Sites Act of 1935, which created a national policy for the protection of "historic sites, buildings, and objects of national significance;"
- National Historic Preservation Act, as amended, which created policies for the preservation of historic properties throughout the nation, put in place the Section 106 review process (see below), and established the NRHP and the State Historic Preservation Officers;
- American Indian Religious Freedom Act of 1978, which, among other things, protects Native American access to sacred sites;
- Archaeological Resources Protection Act of 1979, which was designed to protect archaeological resources on federal and Indian lands;
- Native American Graves Protection and Repatriation Act of 1990, which "gives ownership and control" of Native American human remains and associated objects excavated on federal and Indian lands to Native Americans; and
- Executive Order 13007, Indian Sacred Sites, which was designed to protect, when practical, access to Native American sacred sites on federal land.

Most pertinent to the proposed project is Section 106 of the NHPA, which requires federal agencies to take into account the effects of their undertakings on historic properties, defined in 36 CFR 800.16(l) as any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP.

## 3.3.2 Analysis Area

The cultural and heritage resources analysis area for this project consists of the 250-foot ROW of each alternative.

## 3.3.3 Identification of Cultural Resources

Identification efforts included a records review of previously conducted cultural resources projects in and near the area of potential effects (APE) as described in the five alternatives, historical map research, pedestrian field survey of Alternatives A and C, and consultation with Native American tribes. Next, a cultural resources survey was conducted, and identified cultural properties were then evaluated using the criteria in 36 CFR 60.4 to assess whether they were eligible for listing in the NRHP.

The records review, map research, and in-field survey of Alternative A and C took place in 2008 and 2009 (Hedquist et al. 2009). The survey included conducting a record review to identify prior work and

previously recorded cultural resources in the area, followed by an in-field pedestrian survey of the ROW for each alternative. Six cultural sites were identified along the proposed Alternatives A and C corridors. Of these six cultural sites, three were found to have the characteristics required for listing in the NRHP. Two of the properties are located on private lands, and one is located on BLM lands: the Butterfield Overland Stage Route, the remnants of the Edison R. Lung Homestead, and a small prehistoric Hohokam food processing and procurement site. Two of the properties are located along Alternatives A and C. All three properties are located along Alternative A.

Alternative H and Sub-alternatives F and G have not been surveyed for cultural resources; however, it is known that the Butterfield Overland Stage Route crosses all the alternatives and sub-alternatives. For the purposes of the Draft EIS, it is assumed that no NRHP-eligible resources besides the Butterfield Overland Stage Route are located along those routes.

The Butterfield Overland Stage Route has been assigned Arizona State Museum (ASM) site number AZ T:15:32(ASM), and the SHPO has previously determined it eligible for listing in the NRHP. Within the APE, the route consists of a dirt road that shows minimal evidence of modern use. The Butterfield Overland Stage Route, as a route of communication, settlement, and transportation from St. Louis to San Francisco, is associated with the rapid settlement of California, Arizona, and other points in the West before and after the Civil War (Stein 1994). The Butterfield Overland Stage Route is currently undergoing a feasibility study by the National Park Service for consideration as a National Historic Trail.

Within the analysis area, the Butterfield Overland Stage Route follows the Mormon Battalion Route. The Mormon Battalion Trail was created when about 500 Mormons joined Kearny's Army of the West to help wrest the southwestern United States from Mexico. After taking Santa Fe, Kearny's Army was divided up into smaller task forces with different objectives and routes. The Mormons were assigned to Lieutenant Colonel St. George Cooke to march west to California behind Kearny. Cooke's Mormon Battalion was tasked with constructing a wagon road along the trail to California and making it passable for wheeled vehicles. Therefore, the route is also significant for its association with early American military roads in Arizona that secured a route to California. It may also be significant because of its potential to provide important information about early transportation, communication, and settlement along the route.

The Lung homestead has been assigned site number AZ T:15:11(ASM). This property has the potential to provide important information about the early settlement of Mobile and homesteading in the Little Rainbow Valley.

AZ T:15:94(ASM) is a small prehistoric artifact scatter of ceramics, flaked stone, and ground stone. This site may contain information on prehistoric use and subsistence in the Rainbow Valley.

In addition to the Butterfield Overland Stage Route and the remains of the Lung homestead, the Juan Bautista de Anza NHT also crosses the analysis area. This is a historic corridor that commemorates Anza's 1775–1776 expedition to lead settlers to the San Francisco area through what is now Arizona and California. Congress designated the trail as a National Historic Trail in 1990, as part of the National Trails System. The designated trail corridor crosses all of the project corridors just south of the Butterfield Overland Stage Route.

The purpose of the Anza's expedition was to establish a trail from Sonora to the San Francisco area so that the Spanish could successfully settle Alta California (Gough 2012). The 1775–1776 expedition was actually Anza's second expedition to cross the desert into California. His first expedition left Tubac, Arizona, for Monterey, California, in early 1774 and reached San Gabriel, California, in March (Gough 2012). Not long after his return from California, Anza was commissioned to travel once again to California, this time to establish a mission with settlers in the San Francisco area. Families were recruited

from towns in what is now Mexico. Anza and the settlers then traveled to Tubac to meet up with the two friars that would be establishing the mission. Two hundred forty people, including 153 women and children, set out from Tubac in October 1775. The members of the expedition encountered many hardships such as extreme cold weather, lack of water, treacherous terrain, and disease; however, they reached Monterey in March 1776 (Gough 2012). Anza returned to Mexico City not long after that; the settlers continued their journey to San Francisco, arriving in June. The Anza Trail was used by colonists journeying to California for several years and was crucial to the establishment of the Spanish in Alta California.

The National Park Service is the agency responsible for managing the trail in cooperation with local land managers and agencies. The BLM manages the portions of the trail that lie within its jurisdiction. The *Juan Bautista de Anza National Historic Trail Comprehensive Management and Use Plan* is the current guiding and managing document for the trail, which states the following vision:

> A traveler will be able to hike, ride horseback, bicycle, and drive on a marked route from Nogales to San Francisco and the loop in the eastern portion of San Francisco Bay. Along the way, the visitor can experience landscapes similar to those the expedition saw; learn the stories of the expedition, its members, and descendants; better understand the American Indian role in the expedition and the diversity of their cultures; and appreciate the extent of the accomplishments of Juan Bautista de Anza and his colonizers. (National Park Service 2006:7)

Discussion of the Juan Bautista de Anza NHT Key Observation Point can be found in Visual Resources (Section 3.7). The Juan Bautista de Anza NHT is also discussed in Special Designations (Section 3.15).

### 3.3.4 Native American Religious Concerns

The Little Rainbow Valley is within the cultural landscape of several Native American tribes. The Akimel O'odham have two reservations only a few miles to the east of the valley and consider this area part of their traditional territory. Several other tribal groups, including the Hopi, Pee Posh, and Tohono O'odham, have ancestral claims to the area.

Tribal consultation with the above-listed tribes is currently underway. Letters initiating consultation were sent in July 2008 to the Tohono O'odham Nation, Gila River Indian Community, Ak-Chin Indian Community, Salt River Pima-Maricopa Indian Community, and Hopi Tribe. The Hopi replied on July 28, 2008, requesting to review the cultural resources report and the treatment plan for mitigation of adverse effects if needed. In April 2012, a second set of letters was sent to update the tribes on the new alternatives. The Hopi replied in May 2012, requesting to review the cultural resources report for the new alternatives and the treatment plan for mitigation of adverse effects if needed. In March 2013, a third set of letters was sent that asked the tribes to consult regarding the cultural resources survey report and requested a response regarding any issues they might have in and around the analysis area that may be affected by the proposed undertaking.[3]

The BLM is in consultation with Native American Tribes on issues relating to Tribal concerns including traditional cultural properties (TCPs) and values. The BLM, as a governmental agency,

[3] Draft EIS NOTE: There is no formal response regarding traditional cultural properties (TCPs) or other landscape issues yet. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices.Information on TCPs will need to be updated once consultation is conducted.

will maintain special government-to-government relationships with federally recognized Indian Tribes. Potential TCPs identified by this Project will be assessed by the BLM Field Office (FO) in consultation with the Tribes. Tribal consultation may result in the identification of possible issues relating to Native American traditional cultural or sacred geographies, including TCPs. In this case, further analysis would need to be conducted to assess the impacts of each alternative to these geographies. As of March 2013, consultation has not resulted in the identification of any Native American traditional cultural or sacred geographies. Consultations with traditional communities/groups undertaken by ADOT for other nearby roadway projects have identified types of properties that are generally considered Native American–sensitive sites that could be TCPs. These sensitive sites hold high importance, including but not limited to song culture and traditional observance of travel.

# 3.4 PALEONTOLOGICAL RESOURCES

Paleontological resources consist of "vertebrate and invertebrate animal fossils, plant fossils, and trace fossils" or indications of animal presence such as footprints (BLM 2012a). Fossils have been found throughout Arizona, primarily in northern and southeastern Arizona. Because of the relative rarity of fossils in central Arizona, the BLM considers fossil discoveries in central Arizona as significant (BLM 2012a).

## 3.4.1 Applicable Laws, Regulations, and Policies

Laws, regulations, and policies other than NEPA and FLPMA that involve paleontological resources include the following:

- Antiquities Act of 1906 (16 USC 431–433) regulates "objects of antiquity," which includes fossils.
- Archaeological and Paleontological Salvage (USC 305) states that funds from federal highway projects can be used to salvage paleontological resources.
- EO 11593, Protection and Enhancement of the Cultural Environment (36 CFR 8921), states that a permit is needed to remove paleontological resources from lands under federal jurisdiction.

## 3.4.2 Analysis Area

The paleontological resources analysis area for this project consists of the 250-foot ROW of each alternative.

## 3.4.3 Potential for Paleontological Resources

The BLM uses the Potential Fossil Yield Classification (PFYC) system to determine the potential for the presence of fossils within certain geological formations. The PFYC was initially developed to provide guidance in predicting and assessing paleontological resources by the U.S. Forest Service (Forest Service) and was adopted by the BLM in 2007 (BLM 2007). The PFYC system classifies geological units "based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. The classification is applied to the geological formation, member, or other distinguishable unit, preferably at the most detailed mappable level" (BLM 2007). Table 3-5 defines each PFYC class.

**Table 3-5.** Potential Fossil Yield Classification Classes

| Classification | Description | Management Concern |
|---|---|---|
| Class 1 – Very Low | Geological units that are not likely to contain fossils such as igneous, metamorphic, or Precambrian-age rocks. | Negligible or not applicable |
| Class 2 – Low | Sedimentary geological units that are not likely to contain vertebrate or significant invertebrate or plant fossils such as those younger than 10,000 years, recent eolian deposits, and those that have undergone physical or chemical changes. | Generally low |
| Class 3 – Moderate or unknown | Sedimentary units with variable fossil content and significance or units with unknown potential. | Moderate or cannot be determined |
| Class 4 – High | Geological units with known fossils but with variable occurrence and predictability. The units may be at risk from human disturbance. | Moderate to high |
| Class 5 – Very high | Geological units that consistently and predictably produce fossils of significant scientific value and are at risk of human disturbance. | High to very high |

Source: BLM (2007).

Alternatives A, C, and H and Sub-alternatives F and G are located within Rainbow Valley, which is an alluvial sub-basin of the Salt River valley. Two geological units are found within the analysis area: undivided Quaternary alluvium (Q) and Holocene surficial deposits (Qy) (Figure 3-5). Both units are likely the result of erosion of the primarily Early Proterozoic granitic (Xg), metasedimentary (Xms), and metamorphic rock (Xm) of the surrounding mountains. The undivided Quaternary alluvium is middle to late Pleistocene in age (250,000 years before present [B.P.] to 10,000 years B.P.); the Holocene surficial deposits date to after 10,000 years B.P. The deposits themselves are primarily sandy to gravelly loam (see Section 3.5, Soil Resources, for further description).

Both the undivided Quaternary alluvium, which makes up the majority of the deposits in the analysis area, and the Holocene surficial deposits are assigned a PFYC classification level of 2 (Table 3-6). The alluvial materials that form both the undivided Quaternary alluvium and Holocene surficial deposits are regarded as having a low potential for fossil materials since they are continually subjected to erosion and movement from wind and water.

**Table 3-6.** Geological Units in the Analysis Area and their PFYC and Paleontological Potential Rating

| Geological Unit | Age | PFYC | Paleontological Potential Rating |
|---|---|---|---|
| Younger alluvium (Qy) | Holocene | 2 | Low |
| Undivided alluvium (Q) | Pleistocene | 2 | Low |

# 3.5 SOIL RESOURCES

Following is an overview of the physical features of the analysis area's topography and its underlying soils and geology. The scope of the analysis for topography, geology, and soils includes a review of available data relevant to the scope of the project within the analysis area.

## 3.5.1 Applicable Laws, Regulations, and Policies

Most policies relating to geology and soils are written for the mining, oil, and gas industries. In addition to the laws that provide general authorization and parameters, a number of laws authorize specific

program activities or activities in specific or designated areas. Geology and soil resources on BLM-administered land are currently managed under the Lower Sonoran RMP.

The FLPMA outlines functions of the BLM Directorate, provides for administration of public lands through the BLM, provides for management of the public lands on a multiple-use basis, and requires land use planning, including public involvement and a continuing inventory of resources. It is mandated by Section 302(b) of FLPMA (43 USC 1732[b] and 603[c]; 43 CFR 3802 and 3809) that all operations of any nature that disturb the surface of the mining claim or site require authorization.

NEPA requires the preparation of EISs for federal projects that may have a significant effect on the environment, which includes soils and geological resources.

The Soil and Water Resources Conservation Act of 1977 (16 USC 2001) provides for conservation, protection, and enhancement of soil, water, and related resources.

Soil erosion in Arizona is addressed by the NPDES program, a permitting system for the discharge of any pollutant (except for dredged or fill material) into WUS. This program is administered by the ADEQ under the Arizona Pollutant Discharge Elimination System (AZPDES) program. The ADEQ issues permits on behalf of the EPA for activities in Arizona, except on Indian lands, that could cause impacts to surface water and groundwater sources, including construction activities. As part of the AZPDES program, projects that would disturb more than 1 acre of land are required to obtain coverage under Construction General Permit (CGP) No. AZG2008-001. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation. The AZPDES program is discussed in Section 3.8, Water Resources.

## 3.5.2 Analysis Area

The soil resources analysis area for this project includes the alternative alignments' 250-foot ROWs for soils and the entire Rainbow Valley for geology.

## 3.5.3 Topography

The project lies entirely within the Rainbow Valley sub-basin, a large, valley-wide creosote flat. The project area slopes gently toward the north and northeast. The project area is nearly flat, with an approximate elevation variation of only 230 feet along the length of the project. Elevations range from approximately 1,100 to 1,330 feet above mean sea level (amsl). Numerous unnamed desert washes cross the project corridor from the southwest to northeast, flowing toward Waterman Wash, which then flows along Rainbow Valley toward the northwest, roughly parallel with the project. The project area is included in the area covered by the Mobile and Mobile Northeast, Arizona, 7.5-minute U.S. Geological Survey (USGS) topographic maps dated 1964 through 1983.

## 3.5.4 Geological Setting

The project is located in the valley between the Maricopa Mountains to the southwest and the Sierra Estrella Mountains to the northeast. In a larger context, the project is located in the western portion of the Salt River valley, which is a broad, northeast-southwest-trending alluvial basin characterized by varying degrees of subsurface consolidation (Hammett and Herther 1995). Depth to bedrock in the western Salt River valley ranges from less than 10 feet near the margins to more than 10,000 feet southeast of Gilbert (Arizona Department of Water Resources [ADWR] 1994). The predominant surface geology is late Cenozoic (quaternary) alluvial deposits.

The Salt River valley is bounded by steep mountain ranges composed of igneous, metamorphic, and sedimentary rocks of Precambrian (more than 600 million years old) to Tertiary (63 million to 2 million years old) age (Arizona Bureau of Mines 1960). The basin is filled primarily with unconsolidated to indurated Tertiary and Quaternary (1.5 million years ago to the present day) sedimentary deposits, with lesser amounts of intercalated evaporites and volcanic rocks.

No quaternary faults or folds are mapped in the vicinity of the project, and the project is mapped in an area of very low seismic hazard (USGS 2008). The project is located in an area in which the probability of an earthquake of magnitude 5.0 or greater within 100 years and 50 km is between 10% and 20% (USGS 2008, 2012). Appendix E, Geologic Maps, provides a seismic hazards map, a map of quaternary faults and folds, and an earthquake probability map.

In addition to earthquakes, subsidence and ground fissures also pose geological hazards that should be taken into consideration. Subsidence is the settling of the earth's surface. This effect can be caused by a variety of factors, including groundwater withdrawal, mineral extraction, and faulting. Land subsidence has been occurring across Arizona since the 1950s. Most of the time, there is no clear, identifiable sign that land subsidence has occurred in an area. Some areas in Maricopa and Pinal Counties have subsided more than 18 feet since 1950. Land subsidence in the basins of Arizona is generally the result of compaction of the alluvium, which is caused by lowering of the water table. As the water table declines, pores in the alluvium once held open by water pressure are no longer supported and collapse. Collapse and subsequent lowering in elevation of the land surface result in land subsidence that is generally not recoverable. If this subsidence occurs over areas of bedrock, differential subsidence can occur (ADWR 2012a; Arizona Geological Survey [AGS] 2012a).

Differential subsidence occurs when adjacent areas subside at different rates. Bedrock will not compress like the surrounding alluvium, which creates a subsurface platform. Differential subsidence occurs where shallow bedrock and deep bedrock are adjacent to each other, which creates a zone of differential change in surface elevation. Because of these differing amounts of subsidence, tension can build in the alluvium layer at this differential subsidence zone, which causes an earth fissure to form (AGS 2012b).

Mapping provided by the AGS Earth Fissure Mapping Program was reviewed to determine whether fissures have been reported or confirmed in the vicinity of the project. This mapping program also includes reported but unconfirmed fissures. Although the project is not located within one of the AGS (2012b) analysis areas, a review of the mapping indicates that ground fissures have not been reported or confirmed in the vicinity of the project. Appendix E, Geologic Maps, provides a fissure map generated by AGS (2012b).

Landslides are not expected to be a factor for this project. There are no steep slopes on or adjacent to the project, and there is an approximate elevation variation of only 230 feet along the length of the corridor.

## 3.5.5 Geological Hazards

Geological hazards generally include natural occurrences such as earthquakes, landslides, ground subsidence, and fissures. These geological factors need to be taken into consideration with regard to development in the area, in particular with respect to engineered structures.

Land subsidence is the lowering of the land surface resulting from changes that take place underground. The common causes of land subsidence from human activity are pumping water, oil, and gas from underground reservoirs; dissolution of limestone aquifers, causing sinkholes; collapse of underground mines; drainage of organic soils; and hydrocompaction caused by initial wetting of dry soils. Most subsidence occurs as a result of reduced hydrologic pressure from withdrawal of groundwater across the

area. Land subsidence events, depending on where they occur, can pose significant risks to health and safety or cause interruption of transportation and other services (ADWR 2012a). According to information from the ADWR's Geophysics and Surveying Unit, there is no measurable land subsidence occurring in the Rainbow Valley (Conway 2012). Figure 3-6 shows land subsidence in the analysis area.

Earth fissures are cracks, seams, or separations in the ground caused by tensional forces related to differential land subsidence that accompanies extensive groundwater pumping. Some common and potential hazards associated with earth fissures are cracked or collapsing roads, severed or deformed railroad tracks, broken pipes, damaged well casings or wellheads, broken canal liners, disrupted drainages, human injury, cracked foundation/separated walls, contaminated groundwater aquifer, and broken or disrupted utility lines (ADWR 2012a).

## 3.5.6 Soils

A review of soils data from the Natural Resources Conservation Service (NRCS) (2007) indicates that the project transects many low-slope, sandy to gravelly loam components. Existing NRCS soil surveys for the project area consist of the Gila Bend-Ajo Area (AZ653) and Maricopa County (AZ651). Soils in the project area are almost exclusively those formed in alluvial processes, including alluvial fans, fan terraces, stream terraces, basin and relict basin floors, and stratified stream and fan alluvium. This is consistent with the project's location within a broad valley. Some generalizations can be made about soils on the project area. Soils are dominated by very deep, well-drained soils. Deeper soils consist of gravelly sandy loams with depths to bedrock greater than 60 inches below the surface.

Table 3-7 provides a summary of the identified soil series transected by the project, and Figure 3-7 depicts the various soil associations overlaid on the SVPP analysis area.

**Table 3-7.** Soil Associations within the Sonoran Valley Parkway Project Analysis Area

| Soil Series | Description | Notes |
|---|---|---|
| Agualt | Very deep, well-drained soils formed in stratified stream or fan alluvium. | N/A |
| Antho | Very deep, somewhat excessively drained soils formed in mixed and stratified alluvium. Antho soils are on alluvial fans and flood plains and have slopes of 0% to 5%. | N/A |
| Brios | Very deep, excessively drained soils that formed in mixed and stratified alluvium. Brios soils are on floodplains and alluvial fans and have slopes of 0% to 5%. | N/A |
| Carrizo | Very deep, excessively drained soils formed in mixed alluvium. Carrizo soils are on floodplains, alluvial fans, fan piedmonts, and basin floors. Slope ranges from 0% to 15%. | N/A |
| Coolidge | Very deep, well-drained soils formed in fan or stream alluvium. Coolidge soils are on fan terraces, stream terraces, or relict basin floors. Slopes are 0% to 5%. | N/A |
| Cuerda | Very deep, well-drained soils formed in stratified alluvium. Cuerda soils are on alluvial fans and floodplains and have slopes of about 1%. | N/A |
| Dateland | Very deep, well-drained soils formed in stream or fan alluvium and eolian deposits. Dateland soils are on stream terraces, fan terraces or relict basin floors. Slopes are 0% to 8%. | N/A |
| Denure | Very deep, somewhat excessively drained soils formed in fan or stream alluvium. Denure soils are on relict basin floors, stream terraces or fan terraces and have slopes of 0% to 8%. | N/A |
| Estrella | Very deep, well-drained soils that formed in stratified mixed alluvium. Estrella soils are on alluvial fans and have slopes of 0% to 5%. | N/A |
| Gilman | Very deep, well-drained soils that formed in stratified stream alluvium. Gilman soils are on floodplains and alluvial fans and have slopes of 0% to 3%. | N/A |
| Gunsight | Very deep, somewhat excessively drained, strongly calcareous soils that formed in alluvium from mixed sources. Gunsight soils are on fan terraces or stream terraces and have slopes of 0% to 60%. | N/A |

**Table 3-7.** Soil Associations within the Sonoran Valley Parkway Project Analysis Area (Continued)

| Soil Series | Description | Notes |
|---|---|---|
| Harqua | Very deep, well-drained soils formed in fan alluvium from mixed sources. Harqua soils are on relict basin floors, fan terraces, or stream terraces and have slopes of 0% to 10%. | N/A |
| Laveen | Very deep, well-drained soils that formed in mixed fan alluvium. Laveen soils are on fan terraces, stream terraces, and relict basin floors. Slopes are 0% to 3%. | N/A |
| Maripo | Very deep, somewhat excessively drained soils that formed in recent stratified stream alluvium. Maripo soils are on flood plains and alluvial fans and have slopes of 0% to 3%. | Maripo Sandy Loam is unique to Alternative H |
| Mohall | Very deep, well-drained soils formed in fan and stream alluvium from mixed sources. Mohall soils are on fan terraces, stream terraces, and relict basin floors and have slopes of 0% to 8%. | N/A |
| Perryville | Very deep, well-drained soils that formed in mixed alluvium. Perryville soils are on alluvial fans and terraces and have slopes of 0% to 3%. | N/A |
| Rillito | Very deep, somewhat excessively drained soils that formed in mixed alluvium. Rillito soils are on fan terraces or stream terraces. Slopes are predominantly 0% to 5% but range to 40%. | N/A |
| Torripsamments and Torrifluvents | Frequently flooded. | N/A |
| Tremant | Very deep, well-drained soils formed in fan alluvium, stream alluvium, and eolian deposits. Tremant soils are on fan terraces, stream terraces, or relict basin floors. Slopes are 0% to 5%. | N/A |
| Valencia | Very deep, well-drained soils formed in recent alluvium. Valencia soils are on floodplains and alluvial fans and have slopes of 0% to 2%. | N/A |
| Vecont | Very deep, well-drained soils that formed in alluvium from mixed sources. Vecont soils are on basin floors and have slopes of 0% to 1%. | Vecont Loam is unique to Alternative H |
| Why | Very deep, somewhat excessively drained soils formed in stratified fan alluvium. Why soils are on alluvial fans and floodplains and have slopes of about 1%. | N/A |

Source: U.S. Department of Agriculture, Soil Conservation Service (1974).

For soils in the project area, soil series descriptions and their engineering and management characteristics were reviewed to determine whether sensitive soils were present. All soils reviewed exhibit slow or slow to medium runoff, and the hazard of erosion from water or wind is slight or slight to moderate. All soil reclamation efforts on the project will be limited by the region's dry climate. All soils in the project area are low in organic matter content and generally have poor tilth. Most soils in arid regions such as this contain soluble salts, and in places those salts are concentrated. Fertilizer is generally required to obtain better yields in local soils (NRCS 1977).

Areas in which soils are highly erodible or difficult to reclaim present special problems for surface-disturbing activities and may require additional stabilization and reclamation efforts. Sensitive soils include those with physical and/or chemical characteristics that could exacerbate the rate of soil erosion from disturbed areas and/or inhibit or limit successful stabilization and revegetation in the reclamation of areas disturbed by construction of roadways and staging areas. Both sensitive and non-sensitive soils require the application of appropriate reclamation/revegetation measures to ensure successful stabilization and revegetation of disturbed locations.

The capability classes and capability subclasses of soils in the project area were reviewed to identify potential limitations to reclamation efforts and sensitivity to erosion. Capability classes, which range from Classes I through VIII, are the broadest classification and indicate progressively greater limitations and narrower choices for practical use. All soils in the project area fall under capability Class VII, described as having "very severe limitations that make them unsuited to cultivation and that restrict their use largely

to pasture or range, woodland, or wildlife" (NRCS 1977). Capability subclasses indicate the main limitation of that soil, such as erosion or shallowness. Soils in the project area fall into a variety of capability subclasses, as indicated in Table 3-8.

Table 3-8 shows that the primary limitations on project area soils are being too shallow, droughty, or stony (capability subclass *s*); erosion (*e*); and being too dry (*c*). Although not listed as specific limitations, soils in the project area generally have limited depth of topsoil, low organic content, and a droughty nature. The effects of these limitations on soil resources would be increased potential for erosion and a much longer time required for revegetation to occur. Properly implemented BMPs for soil stabilization and a revegetation plan would serve to minimize these effects.

**Table 3-8.** Soil Capability Classes and Subclasses (non-irrigated) of Project Area Soils

| Soil Series | VIIe | VIIc | VIIs | VIIw |
|---|---|---|---|---|
| Agualt | | | × | |
| Antho | | | × | |
| Brios | | | × | |
| Carrizo | | | × | |
| Coolidge | | | × | |
| Cuerda | | | × | |
| Dateland | × | | | |
| Denure | × | | | |
| Estrella | | × | | |
| Gilman | × | × | × | |
| Gunsight | | | × | |
| Harqua | × | | | |
| Laveen | × | × | | |
| Mohall | | × | × | |
| Perryville | × | | × | |
| Rillito | × | | × | |
| Torripsamments and Torrifluvents | ×* | | | |
| Valencia | | × | | |
| Why | | | | × |

Sources: NRCS (1977, 1997); U.S. Department of Agriculture, Soil Conservation Service (1974).

Notes: Capability Class VII indicates soils with very severe limitations for cultivation and restricts their use largely to pasture, range, woodland, or wildlife. Subclasses indicate that the main limitation is as follows: *e* – risk of erosion; *c* – too cold or too dry; *s* – too shallow, droughty, or stony; or *w* – water in or on the soil interferes with plant growth or cultivation.

* Presumed based on soil characteristics.

Some surface areas within the project area may be covered with biological soil crusts, an intimate association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes that live within or on top of the uppermost millimeters of soil. Biological soil crusts are also known as cryptobiotic, cryptogamic, and microbiotic soil crusts (Rosentreter et al. 2007). Biological soil crusts are recognized as important features of desert ecosystems because of their ability to stabilize the soil; capture and retain atmospheric moisture, rainfall, and nitrogen; facilitate seed germination; and increase nutrient availability for plant growth (Belnap et al. 2001). Biological soil crusts in the Sonoran Desert ecosystem occur as a flat layer on the surface of the soil (Belnap et al. 2001). The removal of this type of biological

soil crust allows water to flow unimpeded over the soil surface, which reduces moisture infiltration into the soil and increases soil erosion (Belnap et al. 2001).

Biological soil crusts are a major component of vegetation communities in the Sonoran Desert (Belnap et al. 2001) and occur in the project area (Felton 2013). All project-related surface disturbance that removes or damages biological soil crusts would negatively impact vegetation communities. Biological soil crusts in desert ecosystems can require decades or centuries to recover. The lack of these soil organisms may slow vegetation reestablishment following disturbance or removal by reducing soil stability and by reducing the availability of moisture and nutrients to growing plants (Belnap et al. 2001). Disturbance that removes soil crust organisms would result in slower recovery of biological soil crust diversity and functioning than disturbance that leaves soil crust organisms and material in place (Belnap et al. 2001).

# 3.6 VEGETATION RESOURCES

This section describes the dominant vegetation communities and special-status plant species, including federally and State-protected species, as well as invasive and noxious weeds. Throughout this section, the term "analysis area" refers to a collective area that includes all alternative routes (Alternatives A, C, H, and Sub-alternatives F and G) analyzed for the SVPP (see Section 3.6.2 below).

The analysis area is located in the Rainbow Valley region within the southern portion of Maricopa County in central Arizona (see Figure 2-1). This alluvial valley is surrounded by mountainous areas, including the Sierra Estrella Mountains, approximately 10 miles to the north, northeast, and east; the Buckeye Hills, approximately 10 miles to the north and west-northwest; and the Maricopa Mountains, approximately 10 miles to the south and southwest. This entire region is a part of the Sonoran Desert, which is characterized by its distinctive bimodal precipitation pattern; this pattern allows for greater vegetative structural diversity than in other North American deserts (Brown 1994).

## 3.6.1 Applicable Laws, Regulation, and Policies

Four federal regulations pertain to plants in this region: 1) those plants listed by the USFWS under the ESA; 2) those plant species listed as Sensitive by the BLM under BLM Manual Section 6840; 3) EO 13112; and 4) the Plant Protection Act of 2000. These federal regulations are described below.

- The ESA, as amended, provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The law requires federal agencies, in consultation with the USFWS and/or the National Oceanic and Atmospheric Administration Fisheries Service, to ensure that actions authorized, funded, or carried out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Destruction on federal lands is illegal, plus import, export, interstate, and foreign commerce of listed plant species are all generally prohibited. Section 7 of the ESA requires federal agencies to ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.
- BLM Manual Section 6840 is a federal guidance document that outlines the criteria for listing species as Sensitive on BLM-administered lands and provides direction on management of those species. BLM Sensitive species are species that the USFWS currently has under status review; species whose populations are declining rapidly and may warrant federal protection in the future; species that have small, widely distributed populations; and species that are located in special or unique habitats. Additionally, Instructional Memorandum (IM) No. AZ-2006-002, Change 1,

dated September 30, 2006, provides an updated list of the species designated Sensitive by the BLM in Arizona.

- Federal agencies are directed by EO 13112, Invasive Species, to expand and coordinate efforts to prevent the introduction and spread of invasive plant species and minimize the economic, ecological, and human health impacts that invasive species may cause.
- The Plant Protection Act of 2000 (PL 106-224) replaced the Federal Noxious Weed Act of 1975 (PL 93-629) and is administered by the Animal and Plant Health Inspection Service of the U.S. Department of Agriculture. This federal program was enacted to protect the health and value of American agriculture and natural resources.

There are two State of Arizona regulations pertaining to plants that apply to this region: 1) the ANPL (ARS 3-904); and 2) Regulated, Restricted, and Prohibited Noxious Weeds (AAC R3-4-244 and R3-4-245). These state regulations are described below.

- The ANPL, as outlined in ARS 3-904, provides protection for nearly 200 native Arizona plant species. This law does not prevent the clearing of land but requires that the ADA be notified before beginning any land-clearing activities. Additionally, a permit is necessary in certain circumstances to remove those native plants. The State of Arizona has four categories for special-status plants; definitions of the categories, as provided under ARS 3-904, follow:
    - Highly Safeguarded (HS): This category includes those species of native plants and parts of plants, including the seeds and fruit, whose prospects for survival in the state are in jeopardy or which are in danger of extinction throughout all or a significant portion of their ranges, and those native plants that are likely within the foreseeable future to become jeopardized or in danger of extinction throughout all or a significant portion of their ranges. This category also includes those plants resident to the state and listed under the ESA and/or other special protection statuses.
    - Salvage Restricted (SR): This category includes those species of native plants to be afforded the exclusive protections involving the use of salvage permits, tags, and seals. This category includes those native plants that are not included in the HS category but are nevertheless subject to a high potential for damage by theft or vandalism.
    - Salvage Assessed (SA): This category includes those species of native plants to be afforded the exclusive protections involving the use of salvage tags and seals and annual salvage permits. This category includes those native plants that are not included in either the HS or SR categories but nevertheless have a sufficient value if salvaged to support the cost of salvage tags and seals.
    - Harvest Restricted (HR): This category includes those species of native plants to be afforded the exclusive protections involving the use of harvest permits and wood receipts. This category includes those native plants that are not included in the HS category but are subject to excessive harvesting or overcutting because of the intrinsic value of their byproducts, fiber, or woody parts.
- Through AAC R3-4-244 and R3-4-245, the State of Arizona addresses the control and eradication of noxious weeds and identifying specific species that fall under three noxious weed categories: regulated, restricted, and prohibited. The Plant Services division of the ADA is responsible for implementing these noxious weed regulations. Definitions of these three weed classes are as follows: 1) regulated noxious weeds are exotic plant species that are well established and generally distributed throughout Arizona; 2) restricted noxious weeds are exotic plant species that occur in Arizona in isolated infestations or very low populations; and 3) prohibited noxious weeds are exotic plant species with known qualities that do not currently exist in Arizona.

## 3.6.2 Analysis Area

The vegetation resources analysis area for this project includes the Rainbow Valley, bounded by SDNM to the west, SR 238 to the south, the Sierra Estrella Mountains to the east, and rural Goodyear to the north.

## 3.6.3 Vegetation Communities

There are five subdivisions of the Sonoran Desert; however, only one is present in the project area. The existing and dominant vegetation community of the project area is defined as the Lower Colorado River Valley (LCRV) subdivision of the Sonoran Desertscrub biotic community (Brown and Lowe 1994). The LCRV subdivision is present throughout the lower-elevation areas of the Rainbow Valley region and the project area, whereas the nearby Arizona Upland subdivision can be found at higher elevations within the surrounding mountain ranges but not within the project area (Figure 3-8). Within the project area, elevations range between approximately 1,100 and 1,330 feet amsl. Several ephemeral drainages are present within the project area; however, most of these washes have narrow channels, with minimal vegetation and infrequent flow. The exception is Waterman Wash, which drains the Rainbow Valley into the Gila River to the northwest and parallels the project area directly to the east. This drainage contains thick stands of xeroriparian vegetation along its banks. No large water features (i.e., lakes, perennial streams, or rivers) that could support broadleaf deciduous riparian vegetation communities, such as willow (*Salix* spp.), cottonwood (*Populus* spp.), or ash (*Fraxinus* spp.), are located within or near the project area.

### *3.6.3.1 Lower Colorado River Valley Subdivision*

The LCRV subdivision represents the largest area of the Sonoran Desert and plays a vital role because it is in direct contact with all other subdivisions of the Sonoran Desert. The LCRV subdivision receives an average of 7 to 10 inches of precipitation annually, which makes it the driest of all Sonoran Desert subdivisions. The LCRV subdivision is characterized by broad alluvial valley floors dominated by creosotebush (*Larrea tridentata* var. *tridentata*) and triangle bursage (*Ambrosia deltodia*). Creosotebush communities strongly dominate in the valley bottoms and frequently predominate along mountain slopes. Although not a dominant part of this vegetation community, cacti species often include cholla (*Cylindropuntia* spp.), saguaro (*Carnegiea gigantea*), and barrel cactus (*Ferocactus* spp.).

In addition to the upland vegetation, xeroriparian vegetation can be found along ephemeral drainages in this community. The major tree species present in the project area include velvet mesquite (*Prosopis velutina*), blue paloverde (*Parkinsonia florida*), desert ironwood (*Olneya tesota*), and crucifixion thorn (*Castela emoryi*). Other non-dominant shrub species present include triangle bur ragweed (*Ambrosia deltoidea*), desert globemallow (*Sphaeralcea ambigua*), range ratany (*Krameria erectica*), big galleta (*Pleureaphis rigida*), and jimmyweed (*Isocoma* sp.).

Xeroriparian vegetation is present along the ephemeral drainages, including Waterman Wash, and these areas contain the majority of the tree species that exist in the project area. Xeroriparian vegetation is associated with an ephemeral water supply (ephemeral washes typically flow only briefly, usually in direct response to significant precipitation in the immediate vicinity). Typically, xeroriparian vegetation occurs as a linear corridor of sparse to dense shrubs and trees in areas with comparatively high soil moisture, such as washes and floodplains within the LCRV subdivision. These areas typically contain plant species that are also found in upland habitats; however, these xeroriparian plant species are commonly larger in structure and occur at higher densities than those in adjacent uplands. Common species in the areas of xeroriparian vegetation within the project area include velvet mesquite, catclaw

acacia (*Acacia greggii* var. *greggii*), and desert ironwood. A complete list of all plant species observed in the project area during field investigations is included in the biological evaluation (BE) prepared for this project (SWCA Environmental Consultants [SWCA] 2009a).

### 3.6.3.2 Supplemental Vegetation Community Data

In addition to the large-scale vegetation community descriptions described above, the project area was also evaluated in terms of the USGS Gap Analysis Program (GAP), which is a land cover data set of natural assemblages of plant species produced by the USGS and other partners (USGS 2004). Figure 3-8 depicts the GAP data within the project area and vicinity, of which four main vegetation communities are present: 1) agriculture; 2) North American Warm Desert Riparian Woodland and Shrubland; 3) Sonora-Mojave Creosotebush-White Bursage Desert Scrub; and 4) Sonora-Mojave Mixed Salt Desert Scrub. All alternatives contain portions of vegetation communities 1, 3, and 4, as described above. However, Alternative A also contains a small portion of vegetation community 2, as described above, which occurs along a tributary of Waterman Wash. Although the GAP vegetation data indicate that the project area is mostly composed of the Creosotebush-White Bursage series of the LCRV subdivision (which may be the result of GAP's mapping methods), during site visits, white bursage was only observed at the far south end of the project area. Additionally, saltbush species (*Atriplex* spp.) were not observed in the project area. Thus, site visits indicated that the project area appears to be composed of a fairly uniform, or homogeneous, stand of creosotebush. A detailed plant species inventory was not completed for this project, however. Nonetheless, the GAP vegetation data do appear to indicate that the majority of the project area is dominated by creosotebush. Descriptions of these four GAP vegetation community categories are provided below, excerpted from USGS (2004:129, 131, 197, 241).

> Agriculture: An aggregated landcover type that includes both pasture and hay: areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle, where pasture/hay vegetation accounts for greater than 20 percent of total vegetation, and Cultivated Crops: areas used for the production of annual crops, such as corn [*Zea mays*], soybeans [*Glycine max*], vegetables, tobacco [*Nicotiana tabacum*], and cotton [*Gossypium hirsutum*], and also perennial woody crops such as orchards and vineyards, where crop vegetation accounts for greater than 20 percent of total vegetation. This landcover type also includes all land being actively tilled. No agricultural land is administered by the BLM, but may be impacted by alternatives.

> North American Warm Desert Riparian Woodland and Shrubland: This ecological system is restricted to intermittently flooded washes or arroyos that dissect bajadas, mesas, plains and basin floors throughout the warm deserts of North America. Although often dry, the intermittent fluvial processes define this system, which are often associated with rapid sheet and gully flow. This system occurs as linear or braided strips within desert scrub- or desert grassland-dominated landscapes. The vegetation of desert washes is quite variable ranging from sparse and patchy to moderately dense and typically occurs along the banks, but may occur within the channel. The woody layer is typically intermittent to open and may be dominated by shrubs and small trees such as *Acacia greggii* [catclaw acacia], *Brickellia laciniata* [splitleaf brickellbush], *Baccharis sarothroides* [desert broom], *Chilopsis linearis* [desert willow], *Fallugia paradoxa* [Apache plume], *Hymenoclea salsola* [burrobrush], *Hymenoclea monogyra* [single-whorl burrobrush], *Juglans microcarpa* [little walnut], *Prosopis* spp.[mesquite], *Psorothamnus spinosus* [smoketree], *Prunus fasciculata* [desert almond], *Rhus microphylla* [littleleaf sumac], *Salazaria mexicana* [Mexican bladdersage], or *Sarcobatus vermiculatus* [greasewood]. This vegetation community is rare on BLM lands, but may occur on private and/or ASLD lands.

Sonora-Mojave Creosotebush-White Bursage Desert Scrub: This ecological system forms the vegetation matrix in broad valleys, lower bajadas, plains and low hills in the Mojave and lower Sonoran deserts. This desert scrub is characterized by a sparse to moderately dense layer (2-50% cover) of xeromorphic microphyllous [plant species with small leaves adapted to dry conditions] and broad-leaved shrubs. *Larrea tridentata* and *Ambrosia dumosa* are typically dominants, but many different shrubs, dwarf-shrubs, and cacti may codominate or form typically sparse understories. Associated species may include *Atriplex canescens* [fourwing saltbush], *Atriplex hymenelytra* [desertholly], *Encelia farinosa* [brittlebush], *Ephedra nevadensis* [jointfir], *Fouquieria splendens* [ocotillo], *Lycium andersonii* [Anderson's wolfberry], and *Opuntia basilaris* [beavertail pricklypear]. The herbaceous layer is typically sparse, but may be seasonally abundant with ephemerals. Herbaceous species such as *Chamaesyce* spp. [sandmat], *Eriogonum inflatum* [desert trumpet], *Dasyochloa pulchella* [fluff grass], *Aristida* spp. [three-awn grass], *Cryptantha* spp. [cryptantha], *Nama* spp. [fiddleleaf], and *Phacelia* spp. [phacelia] are common. BLM lands are primarily composed of this vegetation community.

Sonora-Mojave Mixed Salt Desert Scrub: This system includes extensive open-canopied shrublands of typically saline basins in the Mojave and Sonoran deserts. Stands often occur around playas. Substrates are generally fine-textured, saline soils. Vegetation is typically composed of one or more *Atriplex* [saltbush] species such as *Atriplex canescens* or *A. triplex polycarpa* [cattle saltbush] along with other species of *Atriplex*. Species of *Allenrolfea* [iodinebush], *Salicornia* [glasswort], *Suaeda* [seepweed], or other halophytic plants [a plant adapted to saline soil] are often present to codominant. Graminoid [grass] species may include *Sporobolus airoides* [alkali sacaton] or *Distichlis spicata* [saltgrass] at varying densities. This vegetation community is rare on BLM lands, but may occur on private and/or ASLD lands.

## 3.6.4 Special-Status Plant Species

This section provides a summary of the special-status plant species known to occur or that have the potential to occur in the project area. A more detailed analysis of these species is included in the BE (SWCA 2009a). Six plant species were evaluated for this project: Arizona cliffrose (*Purshia subintegra*), Acuña cactus (*Echinomastus erectocentrus* var. *acuñensis*), Arizona hedgehog cactus (*Echinocereus triglochiditus* var. *arizonicus*), Arizona-Sonoran rosewood (*Vauquelinia californica* spp. *Sonorensis*), Kota Mountain barberry (*Berberis harrisoniana*), and Tumamoc globeberry (*Tumamoca macdougalii*). These species include all plant species for this region that have ESA or BLM special-status designations. None of these species occur in the project area.

### *3.6.4.1 Arizona Native Plant Law Protected Species*

The ANPL provides protection for native plants classified by the ADA. This law states that protected plants cannot be removed from any lands, including private lands, without permission and a permit from the ADA (ADA 2005). Six plant species that have protections under the ANPL were identified in the project area. Table 3-9 lists the ADA-protected plant species growing in the project area and the type of protection they are afforded under the law.

**Table 3-9.** Plants Observed within the Project Area that are Protected under the Arizona Native Plant Law

| Species | Category of Protection |
|---|---|
| Saguaro (normal form) | Salvage Restricted |
| Saguaro (crested/fan-top form) | Highly Safeguarded |

**Table 3-9.** Plants Observed within the Project Area that are Protected under the Arizona Native Plant Law (Continued)

| Species | Category of Protection |
|---|---|
| Blue paloverde | Salvage Assessed |
| Velvet mesquite | Salvage Assessed; Harvest Restricted |
| Barrel cactus | Salvage Restricted |
| Crucifixion thorn | Salvage Restricted |
| Desert ironwood | Salvage Assessed; Harvest Restricted |

## 3.6.5 Noxious Weeds and Invasive Species

Federal regulations, including the EO on Invasive Species and the Plant Protection Act, plus State regulations, including the ADA regulations on noxious weeds, require that the BLM address proposed actions on BLM land throughout the Lower Sonoran Field Office with respect to noxious weeds and the potential effects (Harper-Lore n.d. [2007]). Even though non-native plants were not observed in the project area, they are known to exist in the region; thus, the SVPP could allow the introduction of these species through soil disturbances. Within the Rainbow Valley region, past human disturbances, including agriculture, have provided the pathway for the introduction of numerous non-native plant species. Invasive species that are likely to be present in the Rainbow Valley region include black mustard (*Brassica nigra*), Saharan (Asian) mustard (*B. tournefortii*), buffelgrass (*Pennisetum ciliare*), Mediterranean grass (*Schismus barbatus*), Arabian grass (*S. arabicus*), red brome (*Bromus rubens*), prickly Russian thistle (*Salsola tragus*), Malta starthistle (*Centaurea melitensis*), puncturevine (*Tribulus terrestris*), and saltcedar (*Tamarix* spp.). Although not all of these species are listed as noxious weeds, all are non-native and invasive plant species that could have deleterious effects on the environment; hence, measures should be taken to prevent their introduction and establishment throughout the project area. Table 3-10 provides information on these non-native species that could potentially be introduced by the proposed project.

**Table 3-10.** Invasive Non-native Plant Species with the Potential to Occur in the Project Area

| Common Name | Scientific Name | Growth Form | ADA-Listed Noxious Weed Category |
|---|---|---|---|
| Black mustard | *Brassica nigra* | Annual forb | Not listed |
| Buffelgrass | *Pennisetum ciliare* | Perennial grass | Prohibited and Regulated |
| Saharan (Asian) mustard | *Brassica tournefortii* | Annual forb | Not listed |
| Mediterranean grass | *Schismus barbatus* | Annual grass | Not listed |
| Arabian grass | *Schismus arabicus* | Annual grass | Not listed |
| Red brome | *Bromus rubens* | Annual grass | Not listed |
| Prickly Russian thistle | *Salsola tragus* | Annual forb | Not listed |
| Malta starthistle | *Centaurea melitensis* | Annual/biennial forb | Not listed |
| Puncturevine | *Tribulus terrestris* | Annual forb | Prohibited and Regulated |
| Saltcedar | *Tamarix* spp. | Perennial shrub/Tree | Not listed |

The invasion and establishment of non-native plant species are a threat to the overall health of the Sonoran Desert ecosystem. Not only do these species outcompete the native flora for resources, but the

presence of these invasive, non-native plants also increases the fuel load for wildfires. The flora present in the Sonoran Desert did not evolve with these non-native plants; thus, competition for resources, such as soil, water, and nutrients, is severe, and often the non-natives replace the natives throughout the landscape. In addition, these non-natives do not have natural control systems in a foreign environment; thus, they are able to become established and proliferate without natural ecosystem balances (Sheley and Petroff 1999). Furthermore, the dead stems of these non-natives provide an unnatural fuel load that promotes wildfires, which the Sonoran Desert and its native flora are not adapted to endure. Wildfire can cause rapid and profound changes in desertscrub habitats, both in the short and long term, because many desert plants are not well adapted to large disturbances by fire. In addition, fires now burn hotter and farther in desertscrub habitats, reducing the natural mosaic pattern (patchy distribution of plants and open space) typical of these communities (Esque et al. 2003).

The Arizona Wildlands Invasive Plant Working Group (AZ-WIPWG) developed a categorized list of *Invasive Non-native Plants that Threaten Wildlands in Arizona* (2005) to aid land managers and other stakeholders in addressing noxious weeds. This document provides detailed information on non-native species in Arizona and their level of threats. Table 3-11 provides information from the AZ-WIPWG analysis regarding the non-native plant species identified as occurring in this region with the potential to invade the project area.

**Table 3-11.** Level of Threat Posed by Non-native Plant Species

| Non-native Plant Species | Ecological Impacts* | Invasiveness* |
|---|---|---|
| Arabian grass | B | B |
| Black mustard | Not evaluated | Not evaluated |
| Buffelgrass | A | A |
| Malta starthistle | B | B |
| Mediterranean grass | B | B |
| Prickly Russian thistle | B | B |
| Puncturevine | D | C |
| Red brome | A | B |
| Saharan (Asian) mustard | B | B |
| Saltcedar | A | A |

Source: AZ-WIPWG (2005).

* Scores range from A to D. For ecological impacts, A represents high severity of ecological impacts, whereas D represents a negligible impact to the ecosystem. For invasiveness, A represents the greatest potential to invade an ecosystem, whereas D indicates a low potential of invasion.

# 3.7 VISUAL RESOURCES

The Visual Resources section focuses on the inventory and characterization of the affected environment. Methods of analysis for this evaluation were based on BLM Visual Resource Management guidance. The planning level Visual Resource Inventory (VRI) reported herein provides the BLM's inventory of visual resources as identified and reported in the Lower Sonoran RMP. The Lower Sonoran RMP analysis included an evaluation of scenic quality, sensitivity, and distance zones as well as visual resource management (VRM) classes. A project-level analysis, or site analysis was performed and included an inventory of scenery, viewing locations, and associated Key Observation Points (KOPs) or critical views within the study area. The elements of the landscape are described in terms of form, line, color, and texture. Typically, the more variety in terms of these elements a landscape has, the more interesting or

scenic the landscape becomes if the elements coexist harmoniously. The BLM manages landscapes that require varying levels of protection and modification, giving consideration to the uses and values of other resources and the scenic quality of the landscape. The visual resource analysis was conducted up to 10 miles from the proposed centerline of the alternatives. Critical viewpoints or KOPs were selected to represent critical viewing locations within the viewshed and are used to further assess the visual impacts to the viewing public from the construction and operation of the proposed Parkway. After the contrast rating evaluation and assessment of visual contrast were completed, the impacts to visual resource values were assessed. The visual resource values (e.g., scenic quality, sensitivity, and distance zones) were used to characterize and inventory the visual landscape and serve as the baseline for resource impact assessment and are further detailed in this section.

Public scoping comments revealed that there was general concern for maintaining the landscape and keeping it clear of refuse and negative visual consequences associated with SVPP development.

## 3.7.1 Applicable Laws, Regulations, and Policies

NEPA and FLPMA are the primary laws that require the BLM to address potential effects on visual resources. BLM has developed a system of evaluation specific to visual resources and uses a VRI system to inventory visual resources on public lands. VRI classes are visual ratings that describe an area in terms of visual or scenic quality and viewer sensitivity to the landscape (the degree of public concern for an area's scenic quality). The VRI system uses four classes to summarize the full range of visual values assigned to the landscape: Classes I and II are the most valued, Class III represents moderate value, and Class IV represents the least value. The VRI provides the basis for considering visual values in the resource management planning process (BLM 1992). VRM class designations are legally binding land use plan decisions under FLPMA and 43 CFR 1600.

## 3.7.2 Analysis Area

The visual resources analysis area extends approximately 10 miles from the centerline of all project alternatives, in order to represent a reasonable viewshed from which the project would be seen. This area of analysis was determined through the use of BLM VRM guidance for visual analyses as well as a project-level GIS delineation of the geographic area visible from the proposed alternatives, referred to as a viewshed delineation. For this evaluation, a viewshed analysis, selection of KOPs, and subsequent visual contrast assessment from each KOP was conducted. An inventory and characterization of the affected environment for all alternatives was completed through the documentation of landform, vegetation, and water features (scenery), identification of KOPs and critical viewing locations, and identification of BLM VRI and VRM classifications. Figures 3-9 and 3-10 illustrate the existing VRM classes and the location of KOPs within the study area, respectively.

## 3.7.3 Visual Resource Management

VRM classes are established through the resource management planning process. During the resource management planning process, the VRI class boundaries and assignments may be adjusted to reflect resource allocation decisions made in the RMPs. The BLM sets objectives for the management of landscape preservation and change. All lands are placed into one of four classes that identify the degree of acceptable landscape change or alteration, giving consideration to the scenic value of the landscape and other resource values and uses of the land, as described in Table 3-12. Class I objectives are established in areas where no landscape change is desired. Class IV objectives are set for landscapes where BLM manages for uses that will result in substantial landscape changes (e.g., mining, energy development,

wind farms). Classes II and III allow for varying degrees of landscape preservation and change in between Classes I and IV. The VRM objectives can then be used to analyze and determine the visual impacts of proposed activities and to gauge the amount of disturbance an area can tolerate before it exceeds the visual management objectives of its VRM class (BLM 1992).

**Table 3-12.** VRM Classes Defined

| VRM Class | Definition |
|---|---|
| Class I Objective | The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention. |
| Class II Objective | The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be very low. Management activities may be seen, but should not attract attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. |
| Class III Objective | The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. |
| Class IV Objective | The objective of this class is to provide for management activities that require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating of the basic elements. |

Since the overall VRM goal is to minimize visual impacts, mitigating measures should be prepared for all adverse visual contrasts that can be reduced. This requirement also includes reduction of visual contrast within projects that have met the VRM class objectives (BLM 1986a). In addition to mitigation measures and BMPs recommended by BLM, ADOT best management practices for Parkways were also used and are further detailed in Chapter 4.

VRM analysis involves determining whether the visual impacts of the elements of the proposed project would meet the management objectives established for the project area in the RMP. The BLM has established a visual contrast rating process to complete this analysis (BLM 1986a). The VRM class objectives for the SVPP were established in the Lower Sonoran and SDNM RMP (BLM 2012a). During this resource management planning process, the final VRM classes were adopted, indicating the amount of acceptable disturbance for BLM lands within the project area.

Lands in the analysis area have been allocated to VRM Classes I, II, III, and IV management objectives (see Figure 3-9). All BLM lands within the action alternatives are identified as VRM Class IV, which provides for management activities that require major modifications to the existing character of the landscape. These activities may dominate the view and may be the major focus of viewer attention. The action alternatives are also located upon private and state lands which are not subject to BLM VRM requirements for land modification. Other lands within the action alternatives (ASLD, private) are not subject to BLM VRM classifications.

Immediately west of the SVPP project area is the SDNM, which includes lands that have been designated VRM Classes I, II, and III. In addition, the Sierra Estrella Mountains, approximately 5 miles to the east of the project area, include VRM Class I lands. The objectives of Classes I, II, and III are, respectively, to preserve, retain, and partially retain, the existing character of the landscape (BLM 1986b).

## 3.7.4 Existing Visual Conditions

The project area lies in Rainbow Valley, within the incorporated boundaries of the city of Goodyear in Maricopa County, Arizona, between the Sierra Estrella Mountains to the east and SDNM to the west.

### *Scenic Quality and Landscape Character*

Landscape character or scenery reflects the natural landscape where the project is located and is evaluated through an analysis of landform, vegetation, existence of water, scarcity, adjacent scenery, and cultural modifications. The elements of landscape character are combined and expressed in terms of Class A, B, and C, with Class A being the most unique landscape with a high level of visual appeal, and Class C being common, indistinct, and often homogenous appearance.

Rainbow Valley is an intermountain valley, generally surrounded by north-south-trending mountain ranges; the valley is bordered on the north by agricultural and rural development within the city of Goodyear, on the east by the Sierra Estrella Mountains, on the south by the town of Mobile, and on the west by the SDNM and North and South Maricopa Mountains. Generally, these mountain ranges rise between 1,500 and 4,500 feet above the floor of Rainbow Valley.

Rainbow Valley is generally flat, sloping to the southeast at a grade of less than 1%. The valley floor is formed by a series of coalescing alluvial fans and drainages. Waterman Wash and its tributaries form the active drainage system in the valley.

The project area is characterized by low, flat alluvial fans that are divided by relatively straight ephemeral washes that flow from the surrounding mountain ranges to Waterman Wash, which flows north to the Gila River. The project area is characterized as Sonoran Desertscrub; typical vegetation includes creosote-bursage scrub, paloverde, and cacti (see Section 3.6 for a full description of vegetation resources in the project area). Generally, the vegetation cover is sparse across the majority of the project area and is broken by dirt roads, utility corridors, and fence lines. The vegetation cover is most dense along the ephemeral washes.

### *Viewer Sensitivity and Concern Levels*

Sensitive viewing locations, such as residences, roads, or trails, are examples of critical views that may be affected by visual modifications of the landscape. Typical sensitive viewpoints of the Rainbow Valley are from SDNM, the Sierra Estrella Mountains, local residences, the town of Mobile, and SR 238. These areas were determined to be areas which are sensitive to change and would be most likely to be viewed by local residents and visitors.

Concern levels relate to the importance of maintaining existing scenic quality and viewsheds associated with a specific viewing location, and are considered when assessing viewer impacts. The SDNM provides for views and viewing locations often associated with a high degree of viewer concern for maintaining scenic quality because the landscape setting is important. In contrast, a viewing location associated with a State Route, such as SR 238, would have a moderate concern level because viewers are traveling at a high rate of speed and are not seeking a recreational experience. Concern levels for each identified viewing location or KOP were assessed based on the following five criteria: volume of use, viewing duration, concern for visual quality, scenic or historic status, and special status of designations.

### *Distance Zones*

Distance zones are defined as foreground/middle ground (0–5 miles), background (5–15 miles), and seldom seen (7–15 miles or screened). Five KOPs were selected to represent “typical” viewing conditions

for each of the three sensitive viewing locations—travel routes (two KOPs), recreation areas (two KOPs), and residences (one KOP)—and are described as follows:

- **Travel Routes**: highways and roads used by origin/destination travelers and designated scenic or historic byways and recreation destination roads (i.e., roads that provide access to designated recreation areas). Travel routes in the analysis area include the pipeline road, Riggs Road, Rainbow Valley Road, and SR 238.
- **Recreation Areas**: existing recreation sites used for picnicking, camping, hiking, scenic overlooks, rest areas, or other recreational activities. Viewpoints are in the SDNM, North Maricopa Wilderness, and Sierra Estrella Wilderness.
- **Residences**: single-family structures and permanent mobile homes or mobile home parks. One residence in Rainbow Valley was selected to represent typical residential views of the project area. Residences in the background distance zone that would be screened by topography occur in Buckeye, Estrella Mountain Ranch, Palo Verde, and Laveen.

## 3.7.5 BLM Resource Management Plan – Visual Resource Inventory

The VRM class objectives for the project area were established in the Lower Sonoran RMP (BLM 2012a). Lands in the SVPP area have been allocated to VRM Class I, II, III, and IV management objectives. All action alternatives are located on private, state, or BLM Class IV lands, with Class III directly adjacent to the alternatives. The objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic elements.

### *Scenic Quality*

Scenic quality is represented by the character and diversity of landform, vegetation, water, color, and human-made features. Scenic quality measures the inherent visual appeal of the landscape in terms of Classes ranging from A (highest) to C (lowest).

According to the Lower Sonoran RMP, the scenic quality of Sonoran Desert views is generally made up of jagged and isolated mountain ranges that are often thickly vegetated along the flanks with “forests” of columnar cactus and scrubby trees and jut dramatically from vast, flat valleys. Valley floors typically are vegetated with unbroken expanses of low, growing, woody shrubs. Dominant colors range from dark browns to tans and gray, with textures ranging from coarse and broken in the mountain ranges to smooth on the valley floors. The colors and contrasts provided by permanent water usually are absent; however ephemeral drainage washes across the valley floors produce intricate, dendritic lines of greener vegetation that relieve the unbroken expanses. Modifications to landscape views in the form of residential developments and infrastructure have greatly increased during the last 15 years (BLM 2012a).

### *Sensitivity Level Rating Units*

Sensitivity is the measure of public concern for change to the scenic quality of each scenic quality rating unit. Sensitivity is measured based upon user type, amount of use, public interest, adjacent land uses, and presence of special areas. Public concern and management concerns also are considered.

Viewer sensitivity to visual changes in dominant landscapes increases with residential growth. Although numerous factors fuel residential growth, the rugged and open nature of the Sonoran Desert landscape plays, in part, a role in attracting increased numbers of residents. Through public meetings and comments during the planning process, the BLM has learned that the interested public places high concern and value on open space, natural landscapes, and mountain views (BLM 2012a).

#### *Distance Zones*

Distance zones are used to establish the relative visibility of landscapes from major travel routes or observation points and are characterized by the foreground/middle ground, background, and seldom seen.

Distance zones may also be affected by residential growth as new and expanded subdivisions provide viewing locations from which additional landscape change may be noticeable to more residents. Distance zones may also be affected as new travel routes are constructed to accommodate increased population or as heavier traffic occurs on existing routes (BLM 2012a).

# 3.8 WATER RESOURCES

The following section describes the conditions of water resources in the analysis area surrounding the Sonoran Valley Parkway, including descriptions of surface water and groundwater resources, and also discusses water supply and demand in this region. The applicable laws, regulations, and policies are also detailed, as they guide management of surface water and groundwater resources in Maricopa County and in Arizona.

## 3.8.1 Applicable Laws, Regulations, and Policies

### *3.8.1.1 Federal*

The CWA (33 USC 1251–1376), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." Important sections of the CWA are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines.
- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity that may result in a discharge to WUS to obtain certification from the State that the discharge will comply with other provisions of the act.
- Section 402 establishes the NPDES, a permitting system for the discharge of any pollutant (except for dredged or fill material) into WUS.
- Section 404 establishes a permit program for the discharge of dredged or fill material into WUS. This permit program is jointly administered by the USACE and EPA.

As mandated by the Safe Drinking Water Act (PL 93-523), passed in 1974, the EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the visual acceptability of the water. The EPA regulates these types of contaminants through the development of national primary and secondary maximum contaminant levels for finished water. In Arizona, the ADEQ administers the Safe Drinking Water Act.

The current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) indicate that portions of the project alternatives are located in FEMA floodplains or pending floodplains as identified by the FCDMC (Appendix F, FEMA Maps). The FCDMC has submitted the delineation of the pending floodplains to FEMA; however, they have not been published and therefore are not currently being regulated by FEMA. Development in existing FEMA-regulated floodplains requires coordination with FEMA through a Letter of Map Change process. A Conditional Letter of Map Revision (CLOMR) must be requested following the design stages of a project, but prior to construction. The CLOMR serves as an assurance from FEMA that any proposed modifications to mitigate a flood hazard meet FEMA's requirements. Following construction, a Letter of Map Revision (LOMR) must be requested to remove the identified flood hazard areas from FEMA maps. FEMA must issue its own LOMR when pending floodplains are accepted. Development in pending floodplains also requires coordination with the FCDMC.

#### 3.8.1.2 State

In Arizona, the NPDES program is administered by the ADEQ under the AZPDES program. The ADEQ issues permits on behalf of the EPA for activities in Arizona, except on Indian lands, that could cause impacts to surface water and groundwater sources, including construction activities. The ADEQ also administers water pollution control programs and water quality functions throughout the state. As part of the AZPDES program, projects that would disturb more than 1 acre of land are required to obtain coverage under construction general permit (CGP) No. AZG2008-001. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation.

As part of project implementation, a stormwater pollution prevention plan (SWPPP) must be developed and implemented to comply with conditions of the CGP. The SWPPP must include site-specific information on erosion and sediment controls and must list BMPs that will be installed to reduce pollutants and meet water quality standards. As part of the SWPPP, the applicant must implement BMPs to reduce or eliminate stormwater pollution. Dischargers must also comply with State water quality objectives, as defined in AAC Title 18, Chapter 11, Article 1.

ADEQ has developed surface water quality standards, including narrative limitations, to define water quality goals for Arizona's streams and lakes and provide the basis for controlling discharge of pollutants to surface waters. Beneficial uses for water bodies are identified in State water quality standards (AAC Title 18, Chapter 11, Article 1) and must be achieved and maintained as required under the CWA. Beneficial uses can include support of aquatic life, fish consumption, public water supply, and irrigation. The 303(d) list, as required by Section 303(d) of the CWA, is a list of water bodies that have a designated beneficial use that is impaired by one or more pollutants. Water bodies included on this list are referred to as "impaired waters." The State must take appropriate action to improve impaired water bodies by establishing total maximum daily loads and reducing or eliminating pollutant discharges.

ADWR implements the Groundwater Management Code of 1980 and manages groundwater supplies throughout the state. The goal of the Groundwater Management Code is to control groundwater depletion and provide a means for allocation. Areas of heavy reliance on groundwater have been identified and designated Active Management Areas (AMAs). Pursuant to the Groundwater Management Code, the five designated AMAs are required to comply with regulations and remain the primary focus of ADWR's long-term groundwater management and conservation efforts. The SVPP is in the Phoenix AMA.

#### 3.8.1.3 Local

Development in floodplains within the jurisdictional area of Maricopa County is regulated and enforced by the FCDMC. FCDMC has delegated floodplain regulation and enforcement occurring within

Goodyear city limits to the City. The Floodplain Regulations for Maricopa County were adopted in 1986 and as amended comply with the directives in Sections 48-3603 and 48-3609 of the ARS pertaining to the National Flood Insurance Program. In accordance with the Maricopa County Floodplain Regulations, a Floodplain Use Permit would be required for any development in regulated and pending floodplains located in the project area. As a coordinated effort to minimize area flooding and cumulative effects on drainage characteristics from development, the FCDMC prepares comprehensive Area Drainage Master Plans for developable portions of the County. The Rainbow Valley Area Drainage Master Plan (2011) provides updated technical design information and recommended strategies for the Waterman Wash watershed. The FCDMC issues Floodplain Use Permits through a cooperative agreement with FEMA. The FEMA requirement includes federal lands; therefore, development on BLM land is not exempt from this process. A Floodplain Use Permit from the FCDMC will be required for any portion of this project occurring in unincorporated county within an effective mapped floodplain.

Within the city of Goodyear, stormwater management is regulated under the adopted Stormwater Pollution Ordinance and guided by the City's Stormwater Management Plan. The City's Engineering Department has developed design guidelines for stormwater management and participates in the SWPPP review process and compliance inspection related to construction site stormwater runoff control.

## 3.8.2 Analysis Area

The analysis area for surface water includes the Waterman Wash watershed, Waterman Wash, the West Prong, and the Gila River downstream of its confluence with Waterman Wash. This analysis area is defined for surface water because a portion of the precipitation that falls on the watershed flows in washes across the project area and discharges to either Waterman Wash or the West Prong and to the Gila River. The analysis area for groundwater resources evaluation includes the Rainbow Valley groundwater sub-basin, located in the West Salt River valley. This extended analysis area was chosen because groundwater from the local area has been identified as the water source that will serve this project.

## 3.8.3 Surface Water

The project area is in the southern part of the Phoenix AMA in the Rainbow Valley basin (Figure 3-11). The valley is bounded on the west by the Maricopa Mountains and on the east by the Sierra Estrella Mountains, and it is characterized by flat terrain that slopes gently to the northeast. The area consists primarily of undeveloped, creosote-dominated alluvial plains with unpaved roads near and intersecting the project area. Waterman Wash, an ephemeral wash that joins the Gila River near Buckeye, is in the northeast portion of the project area and is the primary drainage for Rainbow Valley. Agricultural fields are located within this area, mainly adjacent to Waterman Wash.

### *3.8.3.1 Surface Water Quantity Washes*

No perennial surface water is present within the project area; however, numerous unnamed ephemeral washes that flow in response to rainfall form the Waterman Wash drainage basin. Two named washes fall within the project area: Waterman Wash and the West Prong, the confluence of which intersects the project area at approximately midpoint. Waterman Wash is a relatively straight channel that becomes incised along its upper reaches (URS Corporation 2011a) in the vicinity of the project area. Some preliminary field survey has been conducted for portions of the project area (SWCA 2009e, 2009f, 2009g). More exact estimates of the area of impact to jurisdictional WUS would be made as part of final design and CWA Section 404 permitting.

However, a complete jurisdictional delineation will need to be conducted prior to construction to support CWA Section 404 permitting, to minimize surface water impacts and to evaluate the extent to which washes within the project area exhibit characteristics the USACE may consider indicators of potentially jurisdictional WUS, thus requiring a permit under Section 404 of the CWA. The delineation would identify WUS that would be affected by the SVPP. Section 404 permitting, if required, would be conducted by the City, prior to construction.

#### 3.8.3.2 Sheet Flow

Sheet flow is overland flow of water that is not concentrated into channels. Rain that is not absorbed in the soil will remain on the ground surface and can quickly run downstream as sheet flow with the potential to generate flooding. This flow process occurs in the Rainbow Valley, as wide shallow flow (URS Corporation 2011b) and large sheet flow areas were identified in the vicinity and within the project area (Kellogg 2010). Because the drainage pattern of sheet flow is wide and shallow, it can be a challenge to collect as concentrated flow and convey around or through planned development and recreate shallow sheet flow conditions downstream.

#### 3.8.3.3 Floodplains

The SVPP alternatives are in an area that receives both shallow sheet flow and channelized flow during large storm events (V3 2007). The FEMA FIRMs for Maricopa County (panels 04013C2925G and 04013C2950G in Appendix F, FEMA Maps) show that portions of the project area are located in 100-year and 500-year floodplains as designated by FEMA (2009) and in pending floodplains as proposed by the FCDMC (Figure 3-12). For the most part, these floodplain areas occur where the project alternatives cross larger washes. Development within FEMA-designated and pending floodplains is strictly regulated by both the City and Maricopa County.

#### 3.8.3.4 Surface Water Quality

No surface water exists in the project area vicinity. The nearest perennial surface water is located where Waterman Wash drains into the Gila River, approximately 12 miles north of the project alternatives. An approximately 14-mile reach of the Gila River, downstream of its confluence with Waterman Wash, has been designated an impaired water by ADEQ. It has been determined that pesticides are impairing the surface water quality to the degree that it is affecting the benefits of fish consumption along this reach of the Gila River (ADEQ 2009b).

### 3.8.4 Groundwater

Groundwater would be required for the first approximately 3.5 years of the SVPP during the construction phase only. The water source has yet to be identified, but will be purchased from an existing local source such as the City or private individual. Because the water source will be local, the analysis area for groundwater resource evaluation focused on the West Salt River valley and Rainbow Valley sub-basins.

#### 3.8.4.1 Existing Conditions

In a regional context, the city of Goodyear is located in the western portion of the Salt River valley sub-basin, which is a broad, northeast-southwest-trending alluvial basin characterized by varying degrees of subsurface consolidation (Hammett and Herther 1995). Depth to bedrock in the West Salt River valley ranges from less than 10 feet near the margins to more than 10,000 feet southeast of Gilbert (ADWR 1994).

Regional data indicate that the deepest part is located in the central part of the basin and may exceed 9,600 feet (ADWR 1994). The main aquifer system is composed of basin-fill deposits that are divided into three distinct hydrogeologic units—the upper, middle, and lower alluvial units (Rascona 2003). Groundwater withdrawal in the West Salt River valley generally has exceeded recharge, creating localized areas of groundwater-level depression.

The project is located in the Rainbow Valley sub-basin. Here, withdrawal has been on the decline since 1972; however, a groundwater depression is still evident in the northwestern portion of the basin (Rascona 2003). This cone of depression is close to the Buckeye Hills, approximately 6 miles northwest of the northernmost section of the project. Although several wells in the vicinity of the project indicate that a rise in groundwater level has occurred between 1991 and 2003, most have seen a drop in groundwater levels (1- to 15-foot decline) for the same period (ADWR 2009). Depth to groundwater in Rainbow Valley ranges from 67 feet below ground surface (bgs) in the northwest to more than 400 feet bgs in the southeast (Rascona 2003).

There are 63 wells registered with ADWR within 1 mile of the project area (Figure 3-13). These wells are used mostly for irrigation and/or water production for domestic use (ADWR 2012b). The average depth of these wells is more than 650 feet bgs, with the deepest well being 1,504 feet bgs.

ADWR maintains a repository for statewide groundwater data known as the Groundwater Site Inventory (GWSI) database. The GWSI contains field-verified well and spring data collected by ADWR or USGS that are continually being updated. A review of GWSI data collected in 2011 and 2012 indicates that the average depth to water in the vicinity of the project is 370 feet bgs (ADWR 2012b).

### 3.8.4.2 Groundwater Recharge

Recharge to the regional aquifer occurs through both natural and artificial processes. Natural recharge occurs in ephemeral streams and along mountain fronts, whereas artificial recharge occurs from effluent discharge and managed underground storage facilities. No managed underground storage facilities are located within the Rainbow Valley; however, other sources of recharge in the basin include incidental recharge from agricultural irrigation.

### 3.8.4.3 Groundwater Flow

In the Rainbow Valley basin, groundwater generally flows northwest toward the Gila River (Figure 3-14). There is, however, an area in the northwestern portion of the basin where groundwater flows southeast toward a cone of depression located near the Buckeye Hills (ADWR 2009; Rascona 2003).

### 3.8.4.4 Groundwater Quality

Water quality data for wells in the vicinity of the project were reviewed. Samples collected from wells near the project between 1975 and 2004 indicate the general water quality is good, but there have been instances in which concentrations have equaled or exceeded drinking water standards for certain water quality parameters. In the majority of the wells, the parameter of concern was fluoride with an occurrence of nitrate/nitrite. In one well near the south end of the project area, the parameter exceedance was manganese and lead (ADWR 2009).

## 3.8.5 Water Supply and Demand

### *3.8.5.1 Water Supply*

An important facet of the Parkway construction would be the use of water for both compaction and dust control in the ROW, along haul roads, and in construction staging areas. Construction water is mixed with soil to increase its strength and is also used as a palliative in dust control. Water would also be used during site reclamation. Water would be purchased from either the City or private individuals; these sources would be determined closer to the start of construction. Construction water would be delivered to the site by pumps through a plastic pipe and stored in a lined pond. The pond would be located within the ROW or on private land and moved as needed to keep pace with construction.

### *3.8.5.2 Demand Projections*

Water demand for the project would occur during the construction phase, which is estimated to last for 43 months (approximately 3.5 years). Total water demand for the construction of the project is estimated to be approximately 250,000 gallons per mile. Table 3-13 provides a summary of the water that is estimated for the construction of each action alternative.

**Table 3-13.** Summary of Estimated Construction Water Use by Action Alternative

| Action Alternative | Length (miles) | Estimated Total Water Use (acre-feet) | Estimated Water Use Per Year (acre-feet per year) |
|---|---|---|---|
| A | 15.72 | 12.06 | 3.02 |
| C | 18.12 | 13.90 | 3.48 |
| H | 18.28 | 14.02 | 3.50 |
| F | 3.19 | 0.24 | 0.06 |
| G | 2.38 | 0.18 | 0.05 |

# 3.9 WILDLAND FIRE MANAGMENT

## 3.9.1 Applicable Laws, Regulations, and Policies

The Lower Sonoran RMP directs wildland fire management activities on BLM lands that the three Parkway alternatives cross. According to the Lower Sonoran RMP, “wildland fire is a general term describing any non-structure fire that occurs in the wildland. Wildland fires are categorized into two types: wildfires, which are unplanned ignitions or prescribed fires that are declared wildfires; and prescribed fires, which are planned ignitions (Wildland Fire Leadership Council [WFLC] 2009).” The Lower Sonoran RMP identifies three goals for Wildland Fire Management with specific objectives and management actions to attain these goals. The three goals for Wildland Fire Management are:

1. Ensure firefighter and public safety is the highest priority in every fire or fuels management activity.
2. Wildland fuels are managed to protect Wildland Urban Interface (WUI) areas and meet resource management objectives.
3. Limit the extent of wildfires and the impact of fire suppression efforts on wildlife, plant communities, and natural and cultural features.

## 3.9.2 Analysis Area

The wildland fire management analysis area for the SVPP includes the proposed Parkway alignments and immediately adjacent lands that are under the jurisdiction of the BLM's wildland fire management plans and activities.

## 3.9.3 Fire Ecology

Vegetation throughout the area, including all three alternative routes, is sparse and dominated by creosotebush flats. Cacti species, including barrel cactus and saguaro, are present within the analysis area but at low densities. Xeroriparian vegetation is present along the ephemeral drainages, including Waterman Wash, and these areas contain the majority of the tree species that are present within the project area. Tree species present in the project area include velvet mesquite, blue paloverde, desert ironwood, and crucifixion thorn. Other shrub species observed besides creosotebush include triangle bur ragweed, desert globemallow, and jimmyweed.

The existing vegetation type for all three alternative routes is consistent with the Lower Sonoran RMP's description of the fire ecology for sparsely vegetated areas:

> In natural desert scrub communities the distance between shrubs is too great for fire to spread, unless annual plant growth in the interplant spaces is sufficient to carry fire along between shrubs. As a result, such communities experience long fire-return intervals, with frequencies extending hundreds of years (McAuliffe 1995; Rogers and Steele 1981). Wildland fire is thus not a major natural process in the Sonoran Desert ecosystem, and associated vegetation types are not dependent on or adapted to fire (BLM 2002c). Wildfires, whether of human or natural causes, are relatively rare and typically do not exceed 1 or 2 acres before burning out naturally.

## 3.9.4 Fire and Fuels Management

All public lands within the Lower Sonoran RMP are assigned to one of the following allocations for fire management (BLM 2004b):

- Allocation 1: Management of wildland fire to meet multiple objectives (areas suitable for managing fires to achieve resource objectives) is allowed.
- Allocation 2: Initial action is suppression (areas not suitable for managing fires to achieve resource objectives). These lands are not typically fire adapted. Therefore, using wildfire to meet resource objectives is not an appropriate action on these lands.

The alternative Parkway alignments cross lands that are in Allocation 2 and consist of large areas dominated by desertscrub communities. Fire is not a part of the natural regime in these communities and is typically human caused.

The majority of the alternative Parkway alignments would cross undeveloped desert landscapes; however, small portions of the alignments cross WUIs that have specific wildland fire management goals. The WUI is defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (National Wildfire Coordinating Group [NWCG] 2008). These areas exist at the northern terminus of the proposed alignments in the city of Goodyear and at the southern termini of the proposed alignments near the community of Mobile. According to the Lower Sonoran RMP:

The goal of the Arizona BLM WUI Strategy is to implement an efficient and effective fuels reduction program. One of the BLM's fire-management goals is to collaborate with communities at risk for wildfire property loss within the WUI to develop plans for risk reduction. Fuels treatments within the Lower Sonoran, both WUI and non-WUI, focus on reducing the size and frequency of wildfires within the non-fire adapted Sonoran Desert ecosystems, as well as the residual, native riparian plant communities, with WUI fuels treatments being the priority. These treatments are conducted utilizing fire, mechanical equipment, manual, herbicide, and biological treatments (e.g., grazing). The desired resource condition is to maintain fuels at non-hazardous levels in WUI areas to provide for public and firefighter safety.

## 3.9.5 Fire Regimes and Condition Classes

A fire regime is a general characterization of the nature of the nature of fires occurring over long periods of time and their immediate effects that generally characterize an ecosystem (Brown 2000). "Fire regimes can be defined through the attributes of frequency, seasonality, size/spatial extent, rotation (or fire cycle), predictability (or variation in fire frequency), and magnitude (both intensity and severity) (Agee 1993; Morgan et al. 2001)." The Lower Sonoran RMP has classified the historical fire regimes on BLM-administered lands based on fire frequency, severity, vegetative communities, and the acres of the vegetative community. The proposed alternative Parkway alignments cross lands that are classified as Fire Regime V. This classification is defined as areas that have fire frequencies of greater than 200 years, have high severity, and are dominated by creosotebush-bursage, paloverde-mixed cacti, Sonoran-Mohave mixed salt desert scrub, and riparian vegetative communities.

Fire regime condition class is assessed by determining the departure of an area from its historical fire regime conditions. Condition Class (CC) 1 describes lands that are within or near historical ranges, CC2 describes lands where fire regimes have changed moderately from historical ranges, and CC3 are fire regimes significantly altered from historical ranges. This departure may have resulted from a number of factors, including fire exclusion or suppression, vegetation resources, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities (Hann et al. 2008). Based on the existing dominant vegetation community of creosotebush bursage and the Fire Regime V classification, the proposed alternative Parkway alignments cross lands that are considered CC1.

## 3.9.6 Fire History

As described by the Lower Sonoran RMP, "wildfire history is closely related to vegetation and climatic patterns in terrestrial ecosystems. Patterns of fire frequency, season, size, severity, and uniformity are functions of existing vegetation conditions, weather, elevation, physiographic features, ignition sources, and fire-suppression activities." Fire history on lands administered by the Lower Sonoran Field Office indicates that fires are infrequent, predominantly human caused near main travel corridors and rivers, and increasingly caused by activities associated with undocumented aliens and drug trafficking operations. Fires generally occur most often between the months of March and September, and the 20-year fire frequency average is four fires a year that burn approximately 4,610 acres in total. According to the Lower Sonoran RMP, the largest single fire that has occurred near the proposed alternative Parkway alignments was the Tracks Fire, which burned in the Maricopa Mountains of the SDNM during summer 1994 and grew to over 5,000 acres.

# 3.10 WILDLIFE AND SPECIAL-STATUS SPECIES

This section describes the occurrence and distribution of wildlife species within the analysis area, including endangered, threatened, special-status, and other sensitive terrestrial species. Throughout this section, the term "analysis area" refers to the collective area that includes all alternative alignments (Alternatives A, C, and H and Sub-alternatives F and G) analyzed for the SVPP (see Section 3.10.2 below). Threatened and endangered species are those species that are protected under the ESA or Arizona state law and include proposed and candidate species. Sensitive species include the BLM Lower Sonoran Field Office priority animal species list, which encompasses BLM Sensitive Species, USFWS Birds of Conservation Concern (BCC)/USFWS MBTA Focal Species, Game Species, and Raptor Species, and AGFD Species of Greatest Conservation Need (SGCN). Wildlife habitat and distribution data were obtained from existing resource data for the BLM Lower Sonoran Field Office, state resource agencies, and other studies. Relevant scientific literature and wildlife management reports were used as the sources for describing species ecology, habitat needs, distribution, and management guidelines.

## 3.10.1 Applicable Laws, Regulations, and Policies

Five federal regulations pertain to wildlife in this region: the ESA, MBTA, Bald and Golden Eagle Protection Act of 1940 (BGEPA), BLM Sensitive Species, and BCC. The ESA is covered in Section 3.10.4. The remaining four regulations are detailed below.

- The Migratory Bird Treaty Act of 1918, as amended, gives federal protection to all migratory birds, including nests and eggs. This law states that it is unlawful to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention …for the protection of migratory birds…or any part, nest, or egg of any such bird" (16 USC 703). More than 800 species of migratory birds are protected under this law. The MBTA includes protection for all raptor species. This regulation does not discriminate between live or dead birds, and it also grants full protection to any bird parts, including feathers, eggs, and nests.

  In order to relocate or destroy any nest and maintain compliance with the MBTA, it is necessary to obtain a permit from the USFWS, the responsible agency for regulating this law. Only those entities permitted by the USFWS can assist in the relocation of birds or nests. Section 1 of the USFWS Region 2 Interim Empty Nest Policy states that if the nest is completely inactive at the time of destruction or movement, a permit is not required in order to comply with the MBTA. If an active nest is observed during any activities related to the project, measures should be taken to protect the nest from destruction and to avoid a violation of the MBTA.

- The Bald and Golden Eagle Protection Act of 1940 (16 USC 668–668c), as amended, prohibits "taking" bald and golden eagles, including their parts, nests, or eggs, without a permit from the USFWS. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle…[or any golden eagle], alive or dead, or any part, nest, or egg thereof." The BGEPA defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." The USFWS defines "disturb" under the BGEPA as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with

normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

- The BLM Priority Species List for the Lower Sonoran Field Office and SDNM includes species that are federally protected under the ESA and MBTA, as well as species that are protected by state laws, including plant and animal species, game species, and migratory birds. These species need to be addressed because BLM policy (Manual 6840) dictates that the BLM must carry out management for the conservation of State-listed plants and animals in addition to species protected under the ESA. BLM Manual 6840 is a federal guidance document that outlines the criteria for listing species as Sensitive on BLM-administered lands and provides direction on management of these species. BLM Sensitive Species are species that the USFWS currently lists under status review; species whose populations are declining rapidly and may warrant federal protection in the future; species that have small, widely distributed populations; and species that are located in special or unique habitats.
- Birds of Conservation Concern, the 1988 amendment to the Fish and Wildlife Conservation Act, mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA." The overall goal is to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of the USFWS. This assessment is derived from three major bird conservation plans: the Partners in Flight North American Landbird Conservation Plan, the United States Shorebird Conservation Plan, and the North American Waterbird Conservation Plan. Bird species considered include nongame birds; gamebirds without hunting seasons; and ESA candidate, proposed endangered or threatened, and recently delisted species. Assessment scores from all three bird conservation plans are based on several factors, including population trends, threats, distribution, abundance, and relative density. The goal of the USFWS regarding BCC species is to prevent or eradicate the need for additional ESA bird listings by implementing proactive management and conservation actions. The USFWS (2008) recommends that these lists be consulted in accordance with EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds.

The Arizona Game and Fish Department manages wildlife in the public trust, under the oversight of the Arizona Game and Fish Commission; and that mandate, for stewardship and responsibility, under Arizona Revised Statute Title 17, embraces all wildlife, including mammals, birds, reptiles, amphibians, mollusks, crustaceans, and fish. The AGFD has developed Arizona's State Wildlife Action Plan 2012-2022 (SWAP), a comprehensive wildlife conservation strategy for the State, to meet federal requirements for conservation funding eligibility. One of the core elements of the SWAP is an AGFD status listing defined as wildlife of conservation priority—described nationally as wildlife Species of Greatest Conservation Need (SGCN). As discussed in the AGFD's Comprehensive Wildlife Conservation Strategy, SGCN are species of vertebrates, crustaceans, and mollusks that rank high in the vulnerability category and have been identified for immediate action. Each species was assessed in terms of vulnerability and assigned as either a Tier 1a, 1b, or 1c ranking, with Tier 1a being the highest threat level. The AGFD also manages and protects all game species in Arizona (AGFD 2006). AGFD maintains a statewide database, the Heritage Data Management System (HDMS), which tracks records for federally listed species and other species of special concern (HDMS 2012). In addition, AGFD maintains a Point Observation Database, which contains data on recorded locations of special-status species, as well as an online tool called HabiMap™ Arizona (HabiMap), which contains data on SGCN and migratory birds. In addition to obtaining data from the aforementioned sources, SWCA also sent a special request to the AGFD HDMS Department in order to obtain data on the nearest recorded location of special-status species. The email response included a spreadsheet of special-status species recorded locations near the project area (AGFD 2012).

## 3.10.2 Analysis Area

The wildlife analysis area for this project includes the Rainbow Valley, bounded by SDNM to the west, SR 238 to the south, the Sierra Estrella Mountains to the east, and rural Goodyear to the north.

## 3.10.3 General Wildlife

### *3.10.3.1 Reptiles and Amphibians*

Reptiles are well adapted to the dry conditions, extreme temperatures, and desertscrub habitats that are common throughout the analysis area. Most lizards in the Sonoran Desert are diurnal (active during the day), whereas snakes are primarily nocturnal (active at night). Amphibians are not as common throughout the analysis area; however, several of the riparian washes that occur throughout the area, primarily Waterman Wash and some of its tributaries, as well as stock tanks in the area, are likely to display ephemeral water flow and vegetation communities that support amphibian populations. Following is a discussion on non-listed or non-sensitive reptile and amphibian species that may be present within the analysis area; a discussion of additional endangered, threatened, and other sensitive reptile and amphibian species is presented in Section 3.10.3.

Snakes that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include the Arizona glossy snake (*Arizona elegans noctivaga*), variable sandsnake (*Chilomeniscus stramineus*), western shovel-nosed snake (*Chionactis occipitalis*), Sonoran whipsnake (*Coluber bilineatus*), red racer coachwhip (*Coluber flagellum piceus*), desert nightsnake (*Hypsiglena chlorophaea*), California kingsnake (*Lampropeltis getula californiae*), spotted leaf-nosed snake (*Phyllorhynchus decurtatus*), saddled leaf-nosed snake (*P. brownii*), Sonoran gophersnake (*Pituophis catenifer affinis*), long-nosed snake (*Rhinocheilus lecontei*), desert patch-nosed snake (*Salvadora hexalepis hexalepis*), Smith's black-headed snake (*Tantilla hobartsmithi*), checkered gartersnake (*Thamnophis marcianus*), Sonoran lyresnake (*Trimorphodon lambda*), Sonoran coralsnake (*Micruroides euryxanthus*), western threadsnake (*Leptotyphlops humilis*), western diamond-backed rattlesnake (*Crotalus atrox*), Sonoran sidewinder (*C. cerastes cercobombus*), speckled rattlesnake (*C. mitchellii*), black-tailed rattlesnake (*C. molossus*), Mohave rattlesnake (*C. scutulatus*), and tiger rattlesnake (*C. tigris*) (Arizona Partners in Amphibian and Reptile Conservation [AZPARC] 2008; HabiMap 2013). It should be noted that the majority of these species are not likely to occur within the project area, but are more likely to occur in the larger analysis area.

Lizards that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include Gila monster (*Heolderma suspectum*), western banded gecko (*Coleonyx variegatus*), Sonoran collared lizard (*Crotaphytus nebrius*), long-nosed leopard lizard (*Gambelia wislizenii*), desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), Goode's horned lizard (*Phrynosoma goodei*), desert horned lizard (*P. platyrhinos*), regal horned lizard (*P. solare*), desert spiny lizard (*Sceloporus magister*), long-tailed brush lizard (*Urosaurus graciosus*), ornate tree lizard (*U. ornatus*), common side-blotched lizard (*Uta stansburiana*), tiger whiptail (*Aspidoscelis tigris*), red-backed whiptail (*A. xanthonota*), and desert night lizard (*Xantusia vigilis*) (AZPARC 2008; HabiMap 2013). As noted for the snake species listed above, some of these species are likely to occur within the project area, and are likely present within the analysis area.

Other reptiles that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include the non-native pond slider (*Trachemys scripta*), Sonora mud turtle (*Kinosternon sonoriense*), and the introduced spiny softshell (*Apalone spinifera*) (AZPARC 2008). As noted for the

other reptiles listed above, the majority of these species are not expected to occur within the project area or analysis area, only in surrounding areas that contain permanent water.

Amphibians that are known to occur or may occur in the Rainbow Valley region, in and adjacent to the analysis area, include the non-native Rio Grande leopard frog (*Rana berlandieri*), the introduced American bullfrog (*R. catesbeiana*), Sonoran Desert toad (*Bufo alvarius*), red-spotted toad (*B. punctatus*), Woodhouse's toad (*B. woodhousii*), and Couch's spadefoot (*Scaphiopus couchii*) (AZPARC 2008; HabiMap 2013). These species would most likely be present in areas with water present during the rainy monsoon season, such as drainages, stock tanks, and low-lying areas where water can pool. Thus, some amphibian species could be present within the project area but are more likely to be present within the analysis area.

### 3.10.3.2 Birds

Desertscrub, riparian habitats, and agricultural areas throughout and adjacent to the analysis area provide a variety of habitat for bird species. Common bird species that are associated with desertscrub habitat include greater roadrunner (*Geococcyx californianus*), horned lark (*Eremophila alpestris*), scrub jay (*Aphelocoma coerulescens*), common raven (*Corvus corax*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), black-throated sparrow (*Amphispiza bilineata*), and sage sparrow (*Amphispiza belli*). Game birds that use desert habitats include mourning dove (*Zenaida macroura*), white-winged dove (*Z. asiatica*), and Gambel's quail (*Callipepla gambelii*) (BLM 1988). Common bird species typically found in desert riparian habitat include yellow-rumped warbler (*Dendroica coronata*), verdin (*Auriparus flaviceps*), black-tailed gnatcatcher (*Poliptila melanura*), red-winged blackbird (*Agelaius phoeniceus*), mourning dove, and common yellowthroat (*Geothlypis trichas*). Numerous other species are thought to occur in the area, including house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), cactus wren (*Campylorhynchus brunneicapillus*), and various flycatchers, kingbirds, thrashers, and sparrows. Additional information on birds that may be present within the analysis area is provided in Sections 3.10.4 and 3.10.5.

### 3.10.3.3 Mammals

The analysis area and surrounding area support habitat for a variety of mammal species, including small and medium-sized mammals, carnivores, bats, and big-game species. Small and medium-sized mammals that are likely present in the region include black-tailed jackrabbit (*Lepus californicus*), antelope jackrabbit (*L. alleni*), desert cottontail (*Sylvilagus audubonii*), desert pocket mouse (*Chaetodipus penicillatus*), Arizona pocket mouse (*Perognathus amplus*), little pocket mouse (*P. longimembris*), cactus mouse (*Peromyscus eremicus*), house mouse (*Mus musculus*), round-tailed ground squirrel (*Spermophilus tereticaudus*), Harris' antelope squirrel (*Ammospermophilus harrisii*), badger (*Taxidea taxus*), raccoon (*Procyon lotor*), and various species of skunk. Carnivore species include mountain lion (*Puma concolor*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), and kit fox (*Vulpes macrotis*) (HabiMap 2013).

Several bat species occur within the analysis area and include both common and sensitive species; additional information on endangered, threatened, and other sensitive bat species is presented in Section 3.10.3. Common bat species are likely to occur along drainages that contain standing bodies of water and adequate vegetative cover. Trees along these drainages may also provide roosting habitat for bats, as well as mines, caves, and other crevices that are present within the Maricopa Mountains along the western boundary of the analysis area. Common bat species that may be found in the desertscrub and wash habitats throughout the analysis area include the pallid bat (*Antrozous pallidus*), Western yellow bat (*Lasiurus xanthinus*), Yuma myotis (*Myotis yumanensis*), Mexican free-tailed bat (*Tadarida brasiliensis*), and western small-footed myotis (*Myotis ciliolabrum*) (HabiMap 2013).

Big-game species within the analysis area include desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus*), and collared peccary, or javelina (*Tayassu pecari*). Additional information on these species is presented in Sections 3.10.4 and 3.10.5.

### 3.10.3.4 Fishes

The analysis area does not provide suitable habitat for fishes because of the lack of a permanent water source.

## 3.10.4 Endangered, Threatened, and Other Special-Status Wildlife Species

### 3.10.4.1 Federally Listed Wildlife Species

Under the ESA, the USFWS lists 15 threatened, endangered, or candidate wildlife species that are known or suspected to occur or that have habitat in Maricopa County (USFWS 2012). Habitat requirements and the potential for occurrence for these 15 species are summarized in Table G-1 in Appendix G, Species Tables.

Of the 15 wildlife species listed by the USFWS, 10 are listed as threatened or endangered and are therefore protected under the authority of the ESA. The remaining five are listed by USFWS as candidate and currently receive no statutory protection under the ESA. Two candidate species, the Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) and the desert tortoise, Sonoran population (*Gopherus agassizii*), have the potential to occur in the analysis area. For the remaining 13 species, the analysis area is either clearly beyond the known geographic or elevational range of these species, or it does not contain vegetation or landscape features known to support these species, or both. Furthermore, the analysis area does not occur in or near any federally proposed or designated critical habitat; however, it does occur within the Sonoran pronghorn (*Antilocapra americana sonoriensis*) Nonessential Population 10(j) area, which is discussed in Table G-1 of Appendix G, Species Tables. The American peregrine falcon (*Falco peregrinus anatum*) and the bald eagle (*Haliaeetus leucocephalus* [desert population]) are delisted species under the ESA; thus, they are not currently afforded protection under the ESA. However, these species are listed as BLM priority species for the Lower Sonoran Field Office and are addressed as a special-status species. Detailed information on these species is provided in the BE (SWCA 2009a) and in Appendix G, Species Tables.

### 3.10.4.2 BLM Special-Status Species

The BLM Lower Sonoran Field Office identifies 67 priority animal species that have the potential to occur within the Field Office and SDNM region. The list of priority species includes the following:

- Selected endangered or candidate species as listed under the ESA;
- BLM Sensitive Species: a species proven to be imperiled in at least part of its range and documented or considered likely to occur on BLM lands;
- BCC: species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA (USFWS 2008);
- Game Species: species managed by AGFD and BLM; and
- Raptor Species: bird species protected under the MBTA and BGEPA.

Habitat requirements and the potential for occurrence for these 67 species are summarized in Table G-2 in Appendix G, Species Tables. Twenty-seven of the 67 priority wildlife species listed for Lower Sonoran Field Office and SDNM by the BLM have the potential to occur or are known to occur within the analysis area. For the remaining species, the analysis area is either clearly beyond the known geographic or elevational range of that species, or it does not contain vegetation or landscape features known to support that species, or both.

Of the 27 priority wildlife species, 11 are listed as BLM Sensitive species and have the potential to occur within the analysis area: Sonoran desert tortoise, Tucson shovel-nosed snake, California leaf-nosed bat (*Macrotus californicus*), cave myotis (*Myotis velifer*), golden eagle (*Aquila chrysaetos*), Great Plains narrow-mouthed toad (*Gastrophryne olivacea*), LeConte's thrasher (*Toxostoma lecontei*), lowland burrowing treefrog (*Smilisca fodiens*), Sonoran green toad (*Bufo retiformis*), Townsend's big-eared bat (*Corynorhinus* [=*Plecotus*] *townsendii*), and western burrowing owl (*Athene cunicularia hypugea*). These species are addressed in Table G-2 in Appendix G, Species Tables.

In addition, seven game species, which are also listed as BLM priority species, have the potential to occur within the analysis area: mountain lion, desert bighorn sheep, mule deer, javelina, Gambel's quail, mourning dove, and white-winged dove (*Zenaida asiatica*). The analysis area occurs within Game Management Unit (GMU) 39, which is divided roughly in half; the analysis area is within the east half of GMU 39. AGFD manages for stable to increasing game populations in GMU 39. There are hunts for deer (mule deer or white-tailed) and javelina; as well as small game, predators, fur-bearers and migratory birds within the analysis area (east half of GMU 39). These species are addressed in Table G-2 in Appendix G, Species Tables.

Furthermore, nine BLM priority species that have the potential to occur in the analysis area are also listed by the AGFD as SGCN. These include Sonoran desert tortoise, Tucson shovel-nosed snake, California leaf-nosed bat, crested caracara (*Polyborus plancus*), desert bighorn sheep, Great Plains narrow-mouthed toad, LeConte's thrasher, lowland burrowing treefrog, and western burrowing owl. However, SGCN are also categorized by vegetation type and for the LCRV vegetation classification, which the majority of the analysis area occurs within, there are 32 SCGN species listed for this portion of the Sonoran Desert Ecoregion. Fifteen of these species are addressed under other status listings. Of the 17 remaining, the analysis area is not within their geographic range; thus, they would not be expected to occur in the analysis area. The remaining two species, sage thrasher (*Oreoscoptes montanus*) and big free-tailed bat (*Nyctinomops macrotis*), could occur within the analysis area.

## 3.10.5 Migratory Birds

In order to promote the conservation of migratory birds, several additional species have been given specific consideration when analyzing the effects of proposed management actions. These species have been identified as priority species for conservation because of their declining abundance or distribution or because of their vulnerability to local and/or rangewide risk factors. Table G-2 in Appendix G, Species Tables, identifies BCC, game, and raptor species and species protected under the MBTA and BGEPA that are also listed by the BLM Lower Sonoran Field Office as priority species that have the potential to occur within the Lower Sonoran Field Office region and SDNM planning region. The species that have the potential to occur within the analysis area include Bell's vireo (*Vireo bellii*), Costa's hummingbird (*Calypte costae*), Crissal thrasher (*Toxostoma crissale*), crested caracara, Gambel's quail, golden eagle, great-horned owl (*Bubo virginianus*), LeConte's thrasher, long-eared owl (*Asio otis*), Lucy's warbler (*Vermivora luciae*), mourning dove, white-winged dove, western burrowing owl, and yellow warbler (*Dendroica petechia*). Arizona Partners in Flight also identifies Costa's hummingbird and LeConte's thrasher as indicators of desertscrub health and Lucy's warbler as an indicator of riparian health (Latta et al. 1999). Through an Arizona Breeding Bird Atlas (ABBA) query in AGFD's HabiMap (2013) of the

three USGS 7.5-minute topographic maps that cover the region, 47 bird species are noted as having confirmed, probable, or possible presence within the area. Many of these species are discussed above or in subsequent sections.

## 3.10.6 Wildlife Connectivity

New road construction has contributed to habitat fragmentation (Meffe and Carroll 1997), leading BLM and other agencies to establish wildlife connectivity linkages in order to reduce the impacts of habitat fragmentation. Two wildlife linkages have been identified within the analysis area: the Sierra Estrella–SDNM linkage zone (Arizona Wildlife Linkages Assessment Workgroup 2006) and a wildlife corridor identified by BLM, as adopted from the *Bighorn Sheep Management Plan* (AGFD 2007a), which incorporates a swath of BLM lands between the Sierra Estrella Mountains and Maricopa Mountains and is identified by AGFD as a possible bighorn sheep dispersal corridor. The Sierra Estrella–SDNM linkage was further modeled through GIS analysis to create a Linkage Design based on habitat suitability and optimal travel routes for a group of focal species representative of that linkage area (Beier et al. 2008). Focal species used to identify the linkage between the Sierra Estrella and Maricopa Mountains included the mountain lion, bobcat, bighorn sheep, mule deer, javelina, desert tortoise, and Gila monster; for each species a biologically best corridor was identified that represented the best route for a species to use as it traveled between large habitat areas (i.e., Sierra Estrella and Maricopa Mountains). Additional focal species for this linkage include the desert iguana, giant spotted whiptail lizard (*Cnemidophorus burti stictogrammus*), leopard chuckwalla (*Sauromalos obesus*), long-tailed lizard (*Urosaurus graciosus*), red-backed whiptail, regal ringneck snake (*Diadophis punctatus regalis*), desert rosy boa (*Lichanura trivirgata*), side-blotched lizard, tiger whiptail, tree lizard, Tucson shovel-nosed snake, zebra-tailed lizard, Sonoran Desert toad, Gambel's quail, roadrunner, burrowing owl, and night-blooming cereus (*Cereus sp.*) (Beier et al. 2008).

The results of the Linkage Design show four linkages between the Sierra Estrella and SDNM: three are linear linkages across Rainbow Valley, and a fourth heads south from the Sierra Estrella, crosses SR 347, and heads southwest to the SDNM (Figure 3-15) (Beier et al. 2008). Of the three linkages that cross Rainbow Valley, the northernmost linkage is entirely contained within the BLM-identified linkage. The central of the three linkages that cross Rainbow Valley overlaps the eastern and western portions of the BLM linkage. The southern Rainbow Valley linkage only overlaps the eastern portion of the BLM linkage at the southern tip of the Sierra Estrella. The central Rainbow Valley linkage is identified as the biologically best corridor for the bobcat, desert tortoise, Gila monster, javelina, and mule deer. The northern Rainbow Valley linkage is identified as the biologically best corridor for bobcat. The southern Rainbow Valley linkage is identified as the biologically best corridor for Gila monster and, to a limited extent, javelina. The biologically best corridor for bighorn sheep and mountain lion between the Sierra Estrella–SDNM linkage does not cross Rainbow Valley.

The overall connectivity goals for this region are to maintain wildlife movement corridors between the Gila Bend Mountains, Gila River Wildlife Area Complex, Buckeye Hills, Sierra Estrella Mountains, and the SDNM. The Rainbow Valley and Vekol Valley, to the south, have been identified as important core desert valley habitat for many reptile, amphibian, and mammal species, as well as a major landscape link between southern and northern Arizona. Waterman Wash and several of its east/west tributaries, which originate from the Sierra Estrella and Maricopa Mountains and flow to the Gila River, support xeroriparian habitat and ephemeral sources of water and are likely critical habitat and corridors for wildlife.

AGFD studies have identified several species crossing the EPNG pipeline road, which parallels the eastern border of the SDNM (AGFD 2008) and is located just west of the action alternatives. Track surveys have detected mule deer, kit fox, and javelina crossing the pipeline road (AGFD 2008).

# 3.11 LANDS AND REALTY

The following section discusses current conditions in terms of land ownership, land use planning, and current land uses, including existing ROWs. The analysis area for existing lands and realty includes the three proposed action alternatives and two sub-alternatives.

## 3.11.1 Applicable Laws, Regulations, and Policies

The following laws, regulations, and policies provide an overview of the direction guiding management of the BLM-administered lands in Arizona.

The primary legal basis for authorizing a ROW grant on BLM land is Section 501 of FLPMA. Under FLPMA, the Secretary of the Interior is authorized to grant, issue, or renew ROWs over, on, or through such land for utilities, roads, trails, highways, railroads, canals, etc. FLPMA provides the BLM with authority to issue ROW grants for the use, occupancy, and development of public lands. The regulations establishing procedures for processing these grants are found in 43 CFR 2800.

In addition to federal land plans, surrounding municipalities and governments have also passed laws, regulations, and policies that guide existing and future land use, municipal, and transportation planning. The City has proposed a major amendment to the *City of Goodyear General Plan 2003–2013* (City General Plan) (City 2003). The City General Plan Amendment (City 2007) guides future development of the SVPA area north of the community of Mobile. The area is located within the City's existing southern planning area (Patterson Road on the north extends approximately 2 miles south of SR 238 on the south), is coterminous with the Maricopa-Pinal County boundary on the east, and generally follows the SDNM boundary on the west. This amendment (City 2007) encompasses approximately 67 square miles of newly annexed land within Maricopa County.

MAG is a council of governments that serves as the regional agency for the metropolitan Phoenix area. MAG undertakes long-range planning and policy development on a regional scale, such as transportation, air quality, and human services. MAG has produced several regional transportation plans that include analysis and feasibility studies of a connecting route through the Rainbow Valley in the vicinity of the Sonoran Valley Parkway. Specifically, the MAG Hidden Valley Transportation Framework Study performed analysis and planning that would "define high capacity corridors, establish future principal arterial network(s), and recommend access management strategies" that would provide infrastructure to future development on newly annexed land (MAG 2009:2-1).

ARS 9-471 promulgates the responsibilities of Arizona municipalities for serving newly annexed land. It requires roads to be provided, basic municipal services to be offered, and public health and safety to be enforced on the annexed lands.

## 3.11.2 Analysis Area

The lands and realty analysis area for this project includes the 250-foot-wide ROW for each alternative alignment.

## 3.11.3 Land Ownership

The analysis area is located entirely within Maricopa County. Maricopa County covers approximately 5.9 million acres. Although Maricopa County is largely dominated by the Phoenix metropolitan area,

there are many rural, undeveloped desert lands within Maricopa County that are managed by federal, state, and local agencies. The land ownership of the proposed project includes BLM-administered land, ASLD State Trust land, and private land. Table 3-14 displays the land ownership acreages, and Figure 3-16 illustrates the land ownership within the analysis area for lands and realty.

**Table 3-14.** Sonoran Valley Parkway Project Planning Area Land Ownership

| Land Ownership | Acreage | % of Total |
|---|---|---|
| Bureau of Land Management | 824.5 | 70% |
| Arizona State Land Department | 105.3 | 10% |
| Private | 262.6 | 20% |

For the portions of the proposed SVPP that are located on private lands, the City will need to acquire ROW from individual property owners. Private property owners will be compensated at market value for land that is acquired for the project ROW, in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended in 1987. For the portions of the proposed SVPP that are located on ASLD lands, the City will need to file applicable ASLD ROW applications, in accordance with ASLD Public Roadway Form (RW-RU) and ARS 37-281.02.

## 3.11.4 Land Use Planning

The project area and vicinity include several county and municipal land use planning areas that have set goals and policies to guide future land use and development. Chief among planning efforts is the City General Plan, as amended (City 2003, 2009b). Land use categories (or classifications) are generally determined by the local governments that have jurisdiction over the land. These categories are tools that provide standard language in the community planning process with which to derive a land use plan. The City has 17 land use categories, including residential, agricultural, and commercial classifications (City 2003).

The majority of the BLM-administered lands within the analysis area are within the planning area of the City General Plan Amendment (City 2007). In the City General Plan Amendment, the City describes the amendment necessary in order to enable the City the ability to provide southern vehicular access, emergency services, and mobility to the southern areas of its jurisdiction. In addition, the existing transportation system currently does not provide an outlet for the southern region of Goodyear. Although the corridor for SR 303L has been identified (to Riggs Road), the extension and outlet for this regional roadway have yet to be resolved (City 2007).

In addition to the City General Plan, the *City of Maricopa General Plan* (City of Maricopa 2006) is adjacent to the analysis area for lands and realty, located just southeast of the southern terminus for the SVPP. No land use planning prescriptions from the *City of Maricopa General Plan* would apply to the SVPP.

## 3.11.5 Current Land Uses

The Proposed Action (Alternative A) is located within an existing utility corridor (the EPNG multi-use utility corridor, as identified in the Lower Sonoran RMP), as shown on Figure 3-16. Figure 3-17 illustrates the existing uses of the EPNG multi-use corridor and their relationship to the Alternative A alignment. The 1-mile-wide, multi-use utility corridor runs roughly parallel to the northern boundary of the SDNM. Allowable uses within this multi-use utility corridor generally include roadways, transmission

lines, gas lines, and pipelines. This multi-use utility corridor has been identified by Section 368 of the Energy Policy Act of 2005 as a designated energy corridor, and the Lower Sonoran RMP acknowledges this designation.

Most of the BLM-administered lands in the analysis area are undeveloped. Some of these lands are encumbered by ROWs, leases, or permits. A ROW allows the use of a specific piece of public land for specific facilities and for a specific period. The majority of the ROWs are authorized under Title V of FLPMA, as amended, for structures, pipelines, and facilities to store and transport water, sewer, electrical, and communications systems; for flood control facilities; and for highways, roads, railroads, and other means of transportation. Other ROWs are also issued for natural gas pipelines under the Mineral Leasing Act of 1920, as amended (30 USC 181–287). The BLM's objective for ROW management is to meet public demand and reduce impacts to sensitive resources by providing an orderly system of development for linear projects and related facilities.

On January 17, 2001, President Clinton established the SDNM with Presidential Proclamation 7397. The Antiquities Act (16 USC 431) authorizes the President to "declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States." The SDNM area encompasses a functioning desert ecosystem with an extraordinary array of biological, scientific, and historic resources (Presidential Proclamation 7397 [66 *Federal Register* 14:7354–7358]). The SDNM is identified as an LUA exclusion area (BLM 2012a).

Government land records, such as master title plats, were reviewed to determine existing authorized uses of the public lands in the analysis area. Table 3-15 provides a list of existing ROWs and leases, with a brief description of each LUA. Table 3-16 provides a list of pending ROWs and leases for proposed uses of the analysis area for lands and realty.

**Table 3-15.** Existing Land Use Authorizations in the Analysis Area

| Serial No. | Description | Legal Description (Township, Range, Section) |
|---|---|---|
| 7397 | Presidential Proclamation establishing SDNM | T2S, R2W, S34 |
| AZA-24482 | Road ROW | T3S, R2W, S3<br>T3S, R1W, S36<br>T4S, R1E, S6 |
| A-21968 | Oil/Gas pipeline ROW | T3S, R1W, S34 |
| A-4287 | Pipeline ROW | T3S, R2W, S14 |
| AR-019018 | Power line ROW | T3S, R2W, S14 |
| AR-04860 | Transmission line ROW | T3S, R2W, S2 |
| PHX-086067 | Gas pipeline ROW | T3S, R2W, S14 |
| PHX-083253 | Pipeline ROW | T3S, R2W, S14 |
| AR-012431 | Open land to mineral entry | T3S, R1W, S29 |
| AZA-033350 | Pipeline ROW | T3S, R1W, S29 |
| A-1901 | Transmission line ROW | T3S, R1W, S18 |
| A-8459 | Cathodic protection station | T4S, R1W, S3 |
| AR-5-7 | Open land to mineral entry | T4S, R1W, S2 |
| PHX-027224 | Railroad station ROW | T4S, R1E, S19 |
| AR-04861 | Transmission ROW | T2S, R2W, S35 |

**Table 3-15.** Existing Land Use Authorizations in the Analysis Area (Continued)

| Serial No. | Description | Legal Description (Township, Range, Section) |
|---|---|---|
| AR-017896 | Cathodic protection station | T3S, R2W, S11 |
| AR-04502 | Open land to mineral entry | T3S, R1W, S27 |
| AR-5-12 | Open land to mineral entry | T3S, R1W, S27 |

Source: BLM (2009a).

**Table 3-16.** Pending Land Use Authorizations in the Analysis Area

| Serial No. | Description | Legal Description (Township, Range, Section) |
|---|---|---|
| AZA 034177 | City of Goodyear | T3S, R2W, S10, 11 |
| AZA 034117701 | Alpha Geotechnical and Materials | T3S, R2W, S18–20, 28, 29, 33, 34 |

Source: BLM (2009a).

In addition to the authorized land uses identified in Table 3-15, lands in the analysis area are popular with residents and visitors to the area for outdoor recreation uses, including hunting, target shooting, back-country driving, mountain biking, natural and cultural resources study, and sightseeing. Agriculture, grazing, and transportation are also existing land uses within the project area.

Uses of notable lands adjacent to the analysis area influence how lands in the analysis area and vicinity will be used. In 2004, a large-scale, master-planned community entity, Amaranth Land, LLC, acquired land adjacent to the east and south of the analysis area with the intention of developing 10,000 acres. However, during the housing market recession of 2008 and 2009, the project was foreclosed on, and there are currently no development or construction plans by Amaranth Land, LLC, or any other known developers in the area.

### 3.11.6 Land Tenure

Land tenure refers to the actions that result in the disposal of public lands or the acquisition of non-federal land or interests. Since September 2008, real estate values and sales have decreased significantly in the analysis area for lands and realty (BLM 2012a).

The Lower Sonoran RMP identifies approximately 152 acres of BLM lands suitable for disposal within the EPNG multi-use utility corridor, near the center of the analysis area for lands and realty (see Figure 3-16). In addition, non-contiguous, mosaic-patterned BLM lands have been identified as suitable for disposal in the analysis area for lands and realty (see Figure 3-16).

## 3.12 LIVESTOCK GRAZING

### 3.12.1 Applicable Laws, Regulations, and Policies

Grazing Administration (43 CFR 4100) is the current guidance for administration of grazing on public lands, exclusive of Alaska.

The Taylor Grazing Act of 1934, as amended (43 USC 315–315r), was passed to prevent overgrazing and soil deterioration on public grazing land; to provide for their orderly use, improvement, and development; and to stabilize the livestock industry.

FLPMA requires that public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values and that, where appropriate, will preserve and protect certain public lands in their natural condition. It was passed to establish policy for managing BLM-administered public lands. To ensure long-term stability and use of BLM-administered public lands by the livestock industry, FLPMA authorized 10-year grazing permits and required a 2-year notice of cancellation. The act also directed grazing advisory boards (formed under the Taylor Grazing Act) to guide the BLM in developing allotment management plans and allocating range betterment funds.

The Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management were developed to achieve the four fundamentals of rangeland health outlined in the grazing regulations (43 CFR 4180.1), as follows: 1) watersheds are functioning properly; 2) water, nutrients, and energy are cycling properly; 3) water quality meets State standards; and 4) habitat for special-status species is protected.

The Public Rangelands Improvement Act of 1978 (USC 1901 *et seq*.) establishes and reaffirms the national policy and commitment to inventory and identify current public rangeland conditions and trends; manage, maintain, and improve the condition of public rangelands so that they become as productive as feasible for all rangeland values, in accordance with management objectives and the land use planning process; charge a fee that is equitable for public grazing use.

Under Article 7-4 of the City of Goodyear Code, it is unlawful for livestock or other large animals to roam at large within the city limits north of Patterson Road. South of Patterson Road is open range, where livestock may roam freely, where permitted. An animal that is restrained within a fence is not considered at large. Therefore, areas used for livestock around the City should be fenced.

## 3.12.2 Analysis Area

The livestock grazing analysis area for this project includes the BLM Beloat and Conley authorized grazing allotments, which would be affected by the proposed project and alternatives.

## 3.12.3 Grazing Allotments

A large portion of the analysis area is classified by BLM as being able to support livestock grazing, and the majority of the land is currently under permit for livestock grazing. Livestock grazing on the analysis area is located within the Beloat and Conley grazing allotments on the Phoenix District of the Lower Sonoran Field Office. These allotments are depicted in Figure 3-18. An AUM refers to the amount of forage necessary to feed one animal unit for a period of 1 month. An animal unit is defined as one mature cow of approximately 1,000 pounds and a calf up to weaning age, usually 6 months, or their equivalent of other animals. Ephemeral authorization is in addition to the year-long grazing preference currently permitted in the 10-year grazing permit (USFWS 2001). The number of animals authorized for ephemeral use varies greatly between years and between allotments, depending on forage production, market conditions, and availability of steers.

The Beloat Allotment contains a combination of BLM, State, and private lands over approximately 176,652 acres, 101,111 acres of which is administered by the BLM. The allotment is designated as

perennial/ephemeral, which means that it may run a year-long livestock operation of approximately 280 cattle, but can apply to temporarily put out more livestock if climatic conditions produce abundant ephemeral forage. The Beloat Allotment is permitted for livestock grazing on both the SDNM and the Lower Sonoran Field Office portions of the allotment. However, there is currently no continuous fence along the pipeline to separate the Lower Sonoran Field Office portion from the SDNM portion. The SDNM portion of the Beloat Allotment consists of 33,600 acres of BLM lands available for grazing (BLM 2012b). Each of the alternatives would create a different pasture design and would include or exclude certain livestock water sources, depending on the alternative. Therefore, each alternative requires a different mitigation scenario (discussed in Section 4.12, Livestock Grazing).

The Conley Allotment contains a combination of BLM, State, and private lands over approximately 118,466 acres, 91,018 acres of which is administered by the BLM. Similar to the Beloat Allotment, the Conley is also designated as a perennial/ephemeral allotment. The portion of the Conley Allotment within the SDNM, consisting of 77,485 acres, was closed to livestock grazing in the 2012 SDNM RMP. However, livestock grazing is permitted on the Lower Sonoran Field Office portion of the Conley outside the monument boundaries and within the project area. Each of the alternatives would create a different pasture design but is unlikely to affect any livestock waters. Nevertheless, each alternative requires a different mitigation scenario (as discussed in Section 4.12, Livestock Grazing).

The actual year-long use on these two allotments varies from year to year, based on resource and livestock market conditions.

Vegetation throughout the area, including on all three alternative routes, is sparse and dominated by creosotebush and triangle bursage. Cacti species, including barrel cactus and saguaro, are present within the analysis area but at low densities. Xeroriparian vegetation is present along the ephemeral drainages, including Waterman Wash, and these areas contain the majority of the tree species that are present within the project area. Tree species present in the project area include velvet mesquite, blue paloverde, desert ironwood, and crucifixion thorn. Other plant species in the area include range ratany, white bursage, big galleta, and annual forbs and grasses.

### 3.12.4 Livestock Movement

Livestock movement within the Beloat and Conley allotments is currently controlled by pasture fencing and livestock waters. The pasture fencing is a permanent fence constructed of multiple strands of barbed wire and is intended to allow specific areas of pasture to be grazed while ensuring that other pasture areas rest and re-grow. To facilitate livestock movement, livestock waters can be turned on and off to draw the livestock to specific areas of the pasture to be grazed (personal communication, Lambeth 2009). Except for boundary fences, there is currently little pasture fencing within the project area on either the Beloat or the Conley allotments. Figure 3-18 shows the current range improvements, including fences and water sources. Most of the wells shown in Figure 3-13 are on private lands and are not available for livestock grazing.

## 3.13 RECREATION MANAGEMENT

The recreation opportunity and setting are provided and managed by local, state, and federal agencies on the public lands within and adjacent to all action alternatives and sub-alternative alignments for the SVPP. These recreation activities cover a broad spectrum of recreational pursuits, from dispersed and casual recreation to organized, BLM-permitted group uses. Typical recreation uses in the area of analysis include OHV driving, hunting, hiking, wildlife viewing, horseback riding, target shooting, camping, mountain biking, geocaching, picnicking, night-sky viewing, scenic driving, and photography. The analysis area's

proximity to metropolitan Phoenix enables large numbers of the public to access BLM and other public lands easily and conveniently.

## 3.13.1 Applicable Laws, Regulations, and Policies

Under Section 201 of FLPMA, the BLM has the authority to inventory resources or other values, including recreation. Section 201 of FLPMA states that "the secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including but not limited to outdoor recreation and scenic values), giving priority to areas of critical environmental concern" (43 USC 1711[a]). Section 202 of FLPMA provides the authority, through the land-use planning process, to consider management of lands for their recreation opportunities.

The analysis area lies within BLM-administered, ASLD State Trust, and private land. Most private land in the analysis area is dedicated to agriculture, but some private land is also used for dispersed recreation such as hunting. In these cases, users would require permission from the landowner to recreate on the land. ASLD State Trust land is also available for dispersed recreation; however, a recreation permit is required to camp, hike, or travel on State Trust land that is designated as open for recreation (ASLD 2009).

Presidential Proclamation 7397 required the preparation of "a management plan that addresses the actions, including road closures or travel restrictions, necessary to protect the objects identified." The required RMP for the SDNM was completed in September 2012.

The SVPP alternatives are consistent with the public lands not designated as recreation management areas (RMAs) described in the Lower Sonoran RMP (BLM 2012a). Public lands that are not designated as RMAs are managed to meet basic Recreation and Visitor Services and resource needs. Recreation is not emphasized; however, recreation activities may occur. The Recreation and Visitor Services resources are managed to allow recreation uses that are not in conflict with the primary uses of these lands.

The BLM OHV management regulations are guided by 43 CFR 8341.1(a). Hunting in the area of analysis is managed and enforced by the AGFD. The recreation management area of analysis includes GMU 39.

## 3.13.2 Analysis Area

The recreation management analysis area for this project includes the Rainbow Valley, bounded by SDNM to the west, SR 238 to the south, the Sierra Estrella Mountains to the east, and rural Goodyear to the north. Recreation occurs throughout the analysis area.

## 3.13.3 Recreation Management—Settings and Opportunities

There are a number of local recreation opportunities under federal, state, tribal, and local management in the vicinity of the proposed SVPP (Figure 3-19). In addition to the BLM Lower Sonoran Field Office, managing agencies include the Maricopa County Parks and Recreation, AGFD, USFWS, and local Tribal governments. However, only BLM, AGFD, and ASLD manage for recreation within the analysis area. The Maricopa County Parks and Recreation, USFWS, and local tribal governments that manage recreation in the vicinity are all located outside the recreation management analysis area.

### 3.13.3.1 BLM Recreation Areas

The BLM Lower Sonoran Field Office offers an abundance of both developed and dispersed recreation opportunities throughout the region surrounding Phoenix, as well as local areas neighboring the analysis area. BLM also issues special recreation permits on a case-by-case basis for certain activities that use BLM-administered land. Currently, there are no special recreation permits issued in the recreation management analysis area; however, multiple special recreation permits are issued adjacent to the analysis area in the SDNM.

BLM land is managed under multi-use mandates set forth in FLPMA. Accordingly, public users may use BLM land for recreation.

For the purpose of recreation management, the Lower Sonoran RMP identifies public lands by special recreation management areas (SRMAs), as required by IM 2011-004. Additional management areas such as recreation management zones (RMZs) or special management areas (SMAs) can also be prescribed on public lands. No RMZs or SRMAs are present within the recreation management analysis area.

SRMAs are areas for which more intensive recreation management is needed because of their high usage and for which recreation is a principal management objective. Public lands not designated as RMAs constitute all public lands outside SRMAs and other special designation areas. These include areas where recreation is nonspecialized and dispersed and does not require intensive management or developed facilities. Recreation may not be the primary management objective, and recreational activities are subject to fewer restrictions in public lands not designated as RMAs.

The BLM manages land in the analysis area as public lands not designated as RMAs. The Lower Sonoran RMP (BLM 2012a) describes recreation uses in public lands not designated as RMAs as providing dispersed recreational opportunities such as rock climbing, hiking, hunting, camping, sightseeing, rock collecting, and OHV use. The goals are to provide primitive facilities for resource protection, visitor safety, and/or improvement or increase of recreational opportunities. The total acreage of public lands not designated as RMAs in the Lower Sonoran RMP is approximately 550,800 acres. The total public lands not designated as RMAs acreage within the recreation management analysis area is approximately 824 acres. Generally, recreation settings are remote, and access is by unmaintained, primitive roads that require high-clearance, often four-wheel-drive, vehicles. Facilities are small and primitive, recreation use is dispersed over the landscape, and BLM staff rarely makes contact with visitors (BLM 2012a).

Chief among BLM recreation opportunities around the analysis area is the SDNM. Established in 2001, the SDNM provides users with opportunities for dispersed recreation in relatively undisturbed settings. Hiking, biking, horseback riding, camping, wildlife viewing, target shooting, hunting, picnicking, and night sky viewing are all popular recreational pursuits in SDNM. OHV use is also a very popular activity, but the SDNM limits OHV use in many areas, particularly wilderness areas and areas that have been degraded from misuse. The BLM Phoenix District office recently closed many routes temporarily in the SDNM to prevent further resource degradation (BLM 2008b). The majority of these closed routes were accessed via the pipeline road that parallels the northern/eastern boundary of SDNM, approximately 400 feet south of the location of the proposed SVPP Alternative A alignment. Cultural and historical interpretation is also a common recreational pursuit in the SDNM. The SDNM contains at least three historically significant national trails: the Juan Bautista de Anza NHT, Mormon Battalion Trail, and Butterfield Overland Stage Route.

BLM-administered land within the analysis area outside the SDNM (see Figure 3-19) is also widely used for recreational pursuits. Common activities include hunting, target shooting, OHV driving, and camping. Hunting is common in the agriculture fields, along canals, and near desert washes. Dove and quail

hunting is most common; however, varmint and small-game hunting also occurs (i.e., coyote, rabbit, and javelina). Big-game hunting for mule deer and desert bighorn sheep is limited in the analysis area but does occur in adjacent areas such as the Buckeye Hills and in the SDNM.

Target shooting is common in the analysis area, particularly in areas that provide a slope or backdrop to absorb ordnance such as hillsides or wash banks. It is the policy of the BLM to allow the safe use of firearms on public lands as long as such activity is permitted by federal, state, and local laws. There are no designated target shooting sites managed by the BLM within the analysis area. Shooting is strictly prohibited in some areas because of high public use and resource concerns. Target shooting is prohibited in areas within 0.25 mile of residences.

OHV driving is limited to open routes; cross-country travel is prohibited, as specified in the Lower Sonoran RMP. Refer to Section 3.14, Travel Management, for discussion of current open route use.

Dispersed camping is an allowable use throughout BLM-administered land, as long as it does not occur within 0.25 mile of a designated wildlife water source and does not cause or result in new damage to vegetation, soils, or other resources. To prevent damage to sensitive resources caused by continual use of any particular area, camping cannot occur for more than a period of 14 days within any 28-consecutive-day period. Most camping occurs in the eastern portion of the analysis area in the foothills of the Sierra Estrella Mountains.

The BLM compiles visitor-use statistics in accordance with IM No. 2003-245 in the Recreation Management Information System (RMIS). RMIS, in conjunction with separate studies and analysis, provides indicators for recreational use trends that aid the BLM in management decisions and prescriptions. RMIS data do not exist for BLM land within the area of analysis; however, there are RMIS data for the SDNM.

### *3.13.3.2 County Recreation Areas*

The Maricopa County Parks and Recreation Department owns and operate two parks north of the analysis area. Buckeye Hills Regional Park is located approximately 5 miles northwest of the northern terminus of the analysis area, and Estrella Mountain Regional Park is located approximately 5 miles northeast of the northern terminus of the analysis area.

Estrella Mountain Regional Park is composed of 19,840 acres of desert mountainous terrain. The recreation setting varies from developed pavilions with electricity to remote, undeveloped backcountry trails. Located near the meeting of the Gila and Agua Fria Rivers, the park includes a large wetland, or riparian, area. The majority of the park remains pristine desert. Many amenities are available to visitors, including the only grass picnic area in the Maricopa County Park System (Maricopa County 2009). Most recreation opportunities in Estrella Mountain Regional Park consist of developed recreation—making use of the picnic areas, pavilions, and easily accessible walking paths.

Buckeye Hills Regional Park consists of 4,474 acres of natural desert. The recreation setting includes the rolling hills of pristine Sonoran Desert, with beautiful views of the Gila River riparian area. The park has restrooms, but currently no running water or electricity is available in the park (Maricopa County 2009). The recreation opportunities in Buckeye Hills Regional Park cater to dispersed recreation, such as hiking, hunting, wildlife viewing, and horseback riding.

# 3.14 TRAVEL MANAGEMENT

As previously discussed, in 2007 the City annexed 67 square miles of its MPA, south of the current city limits, to include an area bounded to the northeast and east by the Sierra Estrella Mountains, Estrella Mountain Regional Park, and the Gila River Indian Community and to the west and southwest by the SDNM. A large network of roadways serves the travel management needs within the city and Maricopa County, which are coordinated by the City, MAG, and, in some cases, MCDOT and ADOT. The City has determined that a major arterial road (the Sonoran Valley Parkway) is needed to provide more direct access to the greater Phoenix metropolitan area for traffic to and from the new MPA near the community of Mobile and the city of Maricopa.

From a transportation perspective, the proposed SVPP would enable the City to establish the necessary north-south corridors to move traffic efficiently in the region. The scope of the analysis for travel management resources includes a discussion of the current transportation network within the footprint of the action alternatives and also includes a 2-mile buffer area. The analysis describes the existing network in terms of state highways, county roads, municipal roads, BLM roads, utility company access roads, and other private roads, in addition to current highway and road usage, including traffic counts, roadway capacity, and level of service.

## 3.14.1 Applicable Laws, Regulations, and Policies

The BLM (2005a) Land Use Planning Handbook (H-1601-1) and BLM (2008a) NEPA Handbook (H-1790-1) specify that travel management resource issues must be considered for all BLM land use planning decisions and NEPA documents.

Because the south end of the proposed action alternative connects to SR 238, the legal responsibilities of ADOT, as established under 28 ARS 7, would apply. It is within the framework of these statutes that ADOT plans, constructs, and maintains a safe, efficient, and modern transportation system.

It is possible that small portions of the proposed Parkway would be located in unincorporated areas of Maricopa County at the time of construction. Accordingly, construction documents for those portions of the project lying within the county at the time of the final design phase will be processed through the MCDOT for review, approval, and issuance of construction permits. MCDOT provides county-wide transportation planning and roadway construction to resolve rural and urban transportation issues and provides maintenance of the Maricopa County transportation system. The MCDOT (2004) *Roadway Design Manual* contains the design standards that govern all construction and reconstruction of transportation facilities in the Maricopa County ROW.

Final design and engineering of the Sonoran Valley Parkway is not included in this EIS analysis and will occur at a later time, subsequent to the issuance of a BLM decision. The City Engineering Department is responsible for the design, review, and inspection of the City's capital infrastructure, including grading and drainage, water, sewer, storm drains, stormwater retention, and streets. The City Engineering Department reviews site plans, preliminary and final plats, rezoning requests, special use permits, construction drawings, and water, sewer, traffic, and drainage master plans. It also issues construction permits and easements and assigns street names and addresses (City 2009c).

## 3.14.2 Analysis Area

The analysis area for travel management was determined to be within 2 miles (either side) of the alternatives. The linear and often regional nature of roads and transportation corridors may result in the

effect that traffic could be discernible beyond 2 miles (e.g., traffic congestion); however, for the purposes of this study and given the relatively rural or exurban nature of the project area, a 2-mile buffer was determined to provide a sufficient area of analysis.

### 3.14.2.1 Highways and Road Descriptions

Following is a comprehensive list of all existing transportation systems within 2 miles of the project area. The systems described include state highways, county roads, BLM roads, utility company access roads, and other private roads in the SVPP analysis area.

#### State Highways

SR 238 is the only highway located within the analysis area. All three action alternatives (Alternatives A, C, and H) terminate at and connect with SR 238 near the community of Mobile. SR 238 is a state highway maintained and managed by ADOT that stretches roughly east-west across central Arizona. SR 238 connects the city of Maricopa with the town of Gila Bend, a distance of roughly 50 miles. SR 238 serves as a means of access to the SDNM and is a commonly used route for residents of the southern part of the Phoenix metropolitan area to travel to southwestern Arizona (Yuma, Arizona) and southern California (San Diego, California).

#### Maricopa County Roads

The Major Streets and Routes Plan Policy, used by MCDOT (2004) to classify county streets, includes six classifications, including expressways, principal arterials, minor arterials, major collectors, minor collectors, and local streets. Most recently, MCDOT, as well as other transportation planning entities within the region, have identified the need for a Parkway classification or a non-freeway restricted access roadway facility option to meet growing traffic capacity needs in rural and exurban areas. MCDOT has developed standards for Parkway design as well as general Parkway capacity measures as part of the functional roadway classifications (Enhanced Parkway Study, MCDOT 2007). Additionally, MCDOT has completed a further study of Parkway design standards in August 2008 titled, *Design Guideline Recommendations for the Arizona Parkway*. The proposed project area and analysis area are located within a sparsely developed network of existing roads (Figure 3-20). Within the analysis area, there are 11 roads classified by Maricopa County: Ocotillo, Chandler Heights, Riggs, Perryville, Rainbow Valley, Reems, Patterson, and Bullard Roads, Cotton Lane, and Sarival and 99th Avenues (MCDOT 2004: Map 14).

Riggs Road is the only road in the analysis area classified as a “principal arterial” road. A principal arterial road provides for long-distance traffic movement within Maricopa County or between Maricopa County and urban areas. Service to abutting land is limited. Access is controlled through frontage roads, raised medians, and the spacing and location of driveways and intersections. Opposing traffic flows are separated often by a raised median. Riggs Road, which runs east-west, is the northern terminus of all three action alternatives.

Bullard Avenue, Patterson Road, and 99th Avenue are classified as “minor arterials” within the analysis area. A minor arterial street provides for moderately long-distance traffic movement within Maricopa County or between Maricopa County and urban areas. Moderate access is provided to abutting land. Access is controlled through frontage roads, raised medians, and the spacing and location of driveways and intersections. A raised median or a continuous left-turn lane separates opposing traffic flows. Alternative C runs east-west along Patterson Road, then north-south along Bullard Avenue. Alternatives A and H bisect Bullard Avenue. Although 99th Avenue is located within the analysis area, none of the proposed action alternatives intersect it.

Ocotillo Road, Chandler Heights Road, Reems Road, Sarival Avenue, Cotton Lane, Rainbow Valley Road, and Perryville Road are classified as "minor collectors" within the analysis area. A minor collector road provides for short-distance (less than 3 miles) traffic movement, primarily functions to collect and distribute traffic between local streets and arterial streets, and provides direct access to abutting land. The spacing and location of intersections and driveways may control some access.

All three action alternatives run north-south along Rainbow Valley Road for approximately 1.5 miles at the north end of the project area. Although Ocotillo Road, Chandler Heights Road, Reems Road, Sarival Avenue, Cotton Lane, and Perryville Road are located within the analysis area, north of the action alternatives, none of the action alternatives intersect them.

### *Bureau of Land Management Roads*

There are numerous routes in the analysis area that have been inventoried and mapped by the BLM (personal communication, Belke 2009). These routes vary from asphalt-paved roads to gravel, sand, or soil surfaces. There are more than 30 miles of BLM-inventoried roads within the analysis area (Figure 3-21). Most of these roads are unnamed, unpaved routes; however, several overlap City and County roads such as Riggs Road, South Road, 187th Avenue, 99th Avenue, SR 238, Patterson Road, 171st Avenue, and Bullard Avenue. Table 3-17 summarizes the total miles of roads within the analysis area.

**Table 3-17.** Miles of Roads in the Analysis Area, by Route Type

| Route Type | Length (Miles) |
|---|---|
| Primary road paved | 1.22 |
| Primary road unpaved | 1.65 |
| Secondary road unpaved | 8.21 |
| Tertiary road unpaved | 20.66 |
| Reclaiming | 0.81 |
| **Total** | **32.55** |

The following section describes the BLM road classifications found within the analysis area, according to the Arizona Route Inventory Data Dictionary (BLM 2003).

A "primary road paved" is a major/minor highway that provides access between major points and generally serves a large area, with many roads branching from the route. A "primary road unpaved" is a regularly maintained road wide enough for at least two vehicles that also provides access between major points, serves a large area, and has many roads that branch off of it.

A "secondary road unpaved" is generally a regularly maintained one-lane road, with other roads of lesser quality branching from it; this route type connects primary roads, and major points. A "tertiary road unpaved" usually consists of a two-track road that may or may not be usable by a two-wheel drive vehicle; formal maintenance is not typically performed on this type of route.

A "reclaiming" road has not been used enough and has intact woody vegetation growing in it that would be damaged by the passage of a vehicle. Erosion and vegetation may block the way, cause the vehicle to get stuck, and/or cause damage to the vehicle.

BLM routes in the analysis area are used for accessing agricultural fields, livestock operations, utility and communication facilities, and range and wildlife developments; they are also increasingly being used by the public for accessing recreation areas such as the Sierra Estrella Mountains and the SDNM. It is

important to note that of the 32.5 miles, 11.1 miles are located within the SNDM; motorized access on these roads is currently prohibited. Figure 3-21 illustrates where access to BLM roads would be retained if the Parkway is constructed, and is discussed in Section 4.14 Travel Management.

### *Utility Company Roads*

There are three linear utilities located within the analysis area: the EPNG Line, Transwestern Pipeline, and El Paso Corporation (El Paso) Transmission Line (Salt River Project 500 kilovolts [kV]). Each of these utility lines is located between the SDNM and the proposed action alternatives; each line also has an associated unpaved access road that parallels the lines.

Some residents of Mobile, as well as others from outside the community, have been using the unpaved EPNG pipeline maintenance road to travel to and from Mobile and the greater Phoenix metropolitan area. The maintenance road runs northwest-southeast and generally parallels the eastern boundary of the SDNM; public use of this road is not authorized by EPNG. The unpaved Transwestern Pipeline access road and El Paso Transmission Line access roads are relatively new lines and access roads, but they also provide a degree of unauthorized access between Mobile and southern Goodyear. None of the action alternatives actually intersects these access roads; however, if one of the action alternatives is implemented, construction of the Parkway could alleviate some of the traffic concerns along these roads.

### *Other Private Roads*

Private roads are owned and maintained by a private individual, organization, or company, rather than by a government. Consequently, unauthorized use of the road may be considered trespassing, and some of the usual rules of the road may not apply. No known private roads intersect any of the action alternatives. Most of the lands surrounding the action alternatives, within the analysis area, are BLM- and State-managed lands. Therefore, although there are several roads used to access private residences and agricultural lands, as well as the Butterfield Station Landfill, most of these roads are not privately owned.

### *Highways and Road Usage*

Traffic volume is an important component for determining what improvements, if any, are required on a highway or street facility, as well as what traffic may result from a proposed Parkway, such as the proposed Sonoran Valley Parkway. Traffic volumes are often expressed in terms of average daily traffic or design hourly volumes. Hourly volumes may be used to calculate the service flow rate, which is typically used to evaluate design alternatives.

### *Existing Traffic Volume (Counts)*

The following discussion focuses on existing traffic volume, based on average annual daily traffic (AADT). According to ADOT, AADT is the annualized average 24-hour volume of vehicles at a given point or section of highway. It is calculated by determining the volume of vehicles during a given period and dividing that number by the number of days in that period (ADOT 2009a). AADT is more commonly known as a traffic count and provides an accurate estimation of vehicular roadway use.

Table 3-18 lists 2008 AADT traffic volumes by vehicles per day (vpd) for SR 238, Rainbow Valley Road, and Bullard Avenue within the analysis area. No traffic counts are provided by ADOT or MCDOT for other analysis area roads. SR 238 has the highest traffic volume, particularly eastbound traffic between MC 85 (at SR 347) and Hidden Valley Road to the west.

**Table 3-18.** Existing Traffic Volumes

| Route | Beginning | Ending | 2008 AADT |
|---|---|---|---|
| SR 238 | Maricopa Road (7 miles west of Mobile) | Hidden Valley Road | 1,941 vpd* |
| SR 238 | Hidden Valley Road | SR 347/Smith Enke Road | 5,731 vpd* |
| Rainbow Valley Road | At Queen Creek Road | – | 399 vpd† |
| Bullard Avenue | At Patterson Road | – | 56 vpd† |

* Source: ADOT (2009b).

† Source: MCDOT (2009).

### *Access*

No continuous system of pedestrian, bicycle, or equestrian facilities currently exists within the proposed area of analysis. Currently, only one fixed route bus service exists within the analysis area (Ajo/Gila Bend to Phoenix Connector). No other bus routes operate within the limits of Maricopa or Mobile. Valley Metro operates the public transportation system (bus and light rail) throughout metropolitan Phoenix and surrounding cities such as Goodyear. Valley Metro operates buses within Goodyear but not in the SVPA. Paratransit is available as a complementary transportation service for qualified persons as required by the Americans with Disabilities Act. The closest paratransit service within the analysis area is the Ajo/Gila Bend to Phoenix Connector (Route 685). This bus route is a dial-a-ride service.

The closest Greyhound bus station is in Casa Grande, and the closest taxicab companies serve Maricopa and Mobile from Chandler or Casa Grande. One shuttle service operates on an on-call basis from the Maricopa Amtrak station to the metropolitan Phoenix area.

In general, the project ROW and analysis area are relatively inaccessible. Although there is a network of roads at the north end of the analysis area and another at the south end near Mobile, no formal access is available in this area. As previously discussed, the members of the public routinely use the area utility corridor access roads (EPNG gas line, Transwestern pipeline, and El Paso Transmission line) to access areas in southern Goodyear and in the city of Maricopa and for recreational pursuits in the region.

Further discussion of future and planned roadways within the analysis area is included in the Travel Management cumulative impacts analysis in Chapter 4, Environmental Effects.

A combination of highways, arterial streets, and BLM roads provide access to the BLM lands within and surrounding the analysis area. Multiple unpaved BLM roads provide access to SDNM, BLM lands available for dispersed recreation within Rainbow Valley, and the Sierra Estrella Wilderness.

## 3.15 SPECIAL DESIGNATIONS

The BLM, through previous inventory and land planning efforts, has identified areas of public land for special designation throughout the Lower Sonoran Field Office as part of the National Landscape Conservation System. Special designations include national monuments, wilderness areas, wilderness study areas, areas of critical environmental concern (ACECs), SRMAs, SMAs, backcountry byways, and national historic or scenic trails (BLM 2005b). The BLM established the National Landscape Conservation System in 2000 to increase public awareness of the scientific, cultural, educational, ecological, and other values present within certain special designations (BLM 2004a).

The overall acreages and summary of the resource values protected by each designation within the analysis area are presented in Table 3-19. No acreage values have been associated with the Juan Bautista de Anza NHT because the exact trail alignment is unknown in certain areas. Rather, a corridor identifies where the trail may have been. Acreages in Table 3-19 have been derived from the best available GIS data unless otherwise stated. As a result, there may be some variation from acreages in previous documents.

**Table 3-19.** Sonoran Valley Parkway Project Analysis Area: BLM Special Designations

| Designation | Acreage | Purpose of Designation |
|---|---|---|
| Sonoran Desert National Monument | 486,400 | Landscape-scale protection of unique natural and cultural resources |
| North Maricopa Mountains Wilderness Area | 63,200 | Wilderness resources |
| South Maricopa Mountains Wilderness Area | 60,100 | Wilderness resources |
| Sierra Estrella Wilderness Area | 14,400 | Wilderness resources |
| Lower Gila Terraces and Historic Trails ACEC | 82,500 | Historic significance/interpretation |
| Juan Bautista de Anza NHT | N/A | Historic significance/interpretation |

Source: BLM (2012).

## 3.15.1 Applicable Laws, Regulations, and Policies

The Lower Sonoran RMP (BLM 2012a) is the current guiding document for the BLM's Lower Sonoran Field Office. The Lower Sonoran RMP guides the management of all BLM-administered land in the project area.

Special designations on BLM-administered land are managed under a variety of laws, regulations, and policies (refer to Chapter 1, Relationship to Policies, Plans, and Programs). Wilderness areas are managed by law under 43 CFR 6300. National monuments are generally managed by the proclamation under which they were designated. Proclamation 7397 designated the SDNM in 2001. The BLM system of national trails is regulated under 43 CFR 8351.1.

## 3.15.2 Analysis Area

The special designations analysis area for this project includes three designated wilderness areas, one national monument, one national historic trail, and a trail corridor that follows the historic Butterfield Overland Stage Route and Mormon Battalion Trail (Figure 3-22), as specified in the Lower Sonoran and SDNM RMPs. The analysis area for special designations is not a defined polygon but rather any topographic point within the wilderness areas or SDNM where sights or sounds from the SVPP may be experienced by a visitor. Special designations included in this affected environment all occur within a 5-mile buffer surrounding the analysis area.

## 3.15.3 Sonoran Desert National Monument

The SDNM, located immediately west and south of the proposed Sonoran Valley Parkway (see Figure 3-22), was established by President Clinton via Presidential Proclamation 7397 on January 17, 2001. The SDNM RMP was completed in September 2012.

The SDNM contains more than 487,000 acres of Sonoran Desert landscape. The Sonoran Desert is the most biologically diverse of the North American deserts, and the SDNM exemplifies this desert setting. The most striking aspect of the plant community within the monument is the extensive saguaro cactus forest. The monument contains three distinct mountain ranges—the Maricopa, Sand Tank, and Table Top Mountains—as well as the Booth and White Hills, all separated by wide valleys. The monument is also home to three Congressionally designated wilderness areas, many significant archaeological and historic sites, and remnants of several important historic trails.

Although fairly remote, the SDNM is approximately 50 miles from the Phoenix metropolitan area and experiences a wide variety of uses, such as OHV use, hiking, horseback riding, and camping. Visitation to the SDNM is higher in the winter months because of the extremely high summer temperatures.

Management concerns have arisen in recent years as more and more visitors seek out the resources and resource uses the SDNM has to offer. As a response to the increased visitation and subsequent resource damage, the BLM has issued several route closures in the region surrounding the action alternatives. The BLM and its volunteers will begin to repair damaged roads, restore lands damaged from illegal off-road use, create undeveloped camping and parking sites, reseed vegetation, and install information signs, maps, and visitor information stands. As each area is restored, the temporary road closures will be opened in stages, starting in 2 to 3 years (BLM 2008b). The temporary road closure became necessary when increased popularity and abuse by some users led to persistent damage of the vegetation and the natural and cultural resources for which the SDNM was designated in 2001.

The SDNM RMP (BLM 2012b) provides the management planning goals, objectives, and resource management prescriptions for the SDNM.

## 3.15.4 Designated Wilderness Areas

The BLM in Arizona is responsible for 47 wilderness areas totaling 1.4 million acres. Congress established these areas through the Arizona Wilderness Act of 1984 and the Arizona Desert Wilderness Act of 1990.

There are three designated wilderness areas within the special designations analysis area for the proposed SVPP (see Figure 3-22); two are inside the SDNM immediately west of the three action alternatives and two sub-alternatives, and one is in the Sierra Estrella Mountains, east of the analysis area. BLM manages these wilderness areas in accordance with the *Maricopa Complex Wilderness Management Plan, Environmental Assessment, and Decision Record* (BLM 1995). These wilderness areas currently provide a standard of solitude and naturalness that ranges from good to outstanding. They contain little to no evidence of surface disturbance, other than former vehicle ways and scattered prospect pits, the majority of which appear in the North and South Maricopa Mountains wildernesses (BLM 1995).

### *3.15.4.1 North Maricopa Mountains Wilderness Area*

The 63,200-acre North Maricopa Mountains Wilderness Area includes roughly the northern one-third of the North Maricopa Mountains. The North Maricopa Mountains Wilderness Area is located within the SDNM, west of the proposed Sonoran Valley Parkway (see Figure 3-22). The northern boundary is a combination of jeep trails, washes, grazing allotment division fences, and a prominent ridge. The southern boundary is on the historic Butterfield Overland Stage Route (see Section 3.13.4.2). The wilderness area is bounded by a 250-kV power line ROW to the west and by another jeep trail to the east. High-clearance and four-wheel-drive vehicles are required to access the North Maricopa Mountains Wilderness Area.

The North Maricopa Mountains are a jumble of long ridges and isolated peaks separated by extensive saguaro-studded bajadas and wide desert washes. Cholla, ocotillo, prickly pear, paloverde, ironwood, and Mexican jumping bean complement the thick stands of saguaro to form classic Sonoran Desert vistas. Commonly seen wildlife includes desert mule deer, javelina, desert bighorn sheep, coyote, desert tortoise, and numerous varieties of lizards and birds (BLM 2009a).

Most users approach the wilderness area from the west side of the SDNM, via MC 85 and the Gila Bend area. In June 2008, BLM closed many routes in SDNM surrounding the North Maricopa Mountains Wilderness Area to motorized use as a result of resource damage (BLM 2008b).

There are two designated trails within the North Maricopa Mountains Wilderness Area. Margie's Cove Trail is located in the heart of the North Maricopa Mountains Wilderness Area. Margie's Cove Trail follows a combination of former vehicle tracks and wide, unmarked desert washes. No trail signage or directional markers are available along the route; therefore, this trail is recommended only for experienced hikers skilled in reading topographic maps. Margie's Cove West Trailhead includes day-use parking for 10 vehicles, three campsites with picnic tables and steel fire rings, a vault toilet, and informational signage. Margie's Cove East Trailhead has day-use parking for five vehicles and informational signage. Access to Margie's Cove East is located north of SR 238 near the southeast corner of the Maricopa Mountains Wilderness Area. Margie's Cove Trail intersects the northern terminus of the Brittlebush Trail in the interior of the North Maricopa Mountains Wilderness Area.

The Brittlebush Trail follows a combination of former vehicle tracks and wide, unmarked desert washes. No trail signage or directional markers are available along the route; therefore, this trail is recommended only for experienced hikers skilled in reading topographic maps. The northern terminus of the Brittlebush Trail intersects the Margie's Cove Trail in the interior of the North Maricopa Mountains Wilderness Area. There is currently no motorized access to the area because of a temporary vehicle closure on the SDNM. Non-motorized access to hiking, bicycling, or horseback is available from SR 238 (BLM 2009a).

### *3.15.4.2 South Maricopa Mountains Wilderness Area*

The 60,100-acre South Maricopa Mountains Wilderness Area includes roughly the southern one-third of the Maricopa Mountains range. This wilderness includes 13 miles of the Maricopa Mountains range, a low-elevation Sonoran Desert range, and extensive desert plains. Because access road conditions vary, high-clearance and four-wheel-drive vehicles are recommended. I-8 parallels the southern boundary of the wilderness area but offers no access to the wilderness. The northern boundary can be accessed from primitive dirt roads south of SR 238, but active railroad tracks and ROWs restrict public crossings. No roads lead to the western and eastern boundaries of the wilderness (Figure 3-22).

The eastern part of the wilderness has an isolated and screened mountainous interior, formed by long ridges and isolated peaks separated by plains and washes. The western part is dominated by desert flats that front the east-west-trending Maricopa Mountains ridgeline.

This area's large size, varied landforms, and wildness provide outstanding opportunities for solitude and primitive recreation. Hiking, backpacking, horseback riding, camping, wildlife observation, and photography are some activities both experienced and family-oriented outdoor enthusiasts can enjoy. Desert bighorn sheep, desert tortoise, coyotes, bobcat, fox, deer, Gambel's quail, and various raptors also inhabit the wilderness. Saguaro, cholla, and ocotillo, paloverde, and mesquite are among the many plant species there.

There are no designated trails within the South Maricopa Mountains Wilderness Area.

### 3.15.4.3 Sierra Estrella Wilderness Area

The 14,400-acre Sierra Estrella Wilderness Area includes roughly one-fourth of the Sierra Estrella Mountains. It is bounded on the north and east by the Gila River Indian Community. The western boundary is a combination of a power line ROW and a jeep trail. The southern boundary is a wash located at the toe of a steep ridge (see Figure 3-22). Four-wheel-drive vehicles are required to reach the Sierra Estrella Wilderness Area. The knife-edged ridgelines, steep slopes, and rough, rocky canyons provide challenges for hikers, backpackers, climbers, and hunters. Butterfly Mountain rises 2,600 feet above the desert plain to an elevation of 4,119 feet in just 2 miles. The Quartz Peak Trail goes to the summit of the Sierra Estrella Mountains.

The extreme differences in elevation have given rise to diverse plant and animal communities. Plants in lower areas include saguaro and cholla, ocotillo, paloverde, and elephant bush. Small, protected sites on top of the mountains have shrub-live oak and even juniper. A remnant herd of desert bighorn sheep roams the mountains, and Gila monster, desert tortoise, mountain lion, mule deer, coyote, javelina, giant spotted whiptail lizard, golden eagle, prairie falcon (*Falco mexicanus*), and Cooper's hawk (*Accipiter cooperii*) also inhabit the wilderness area.

The Quartz Peak Trail leads visitors from the floor of Rainbow Valley (1,550 feet amsl) to the summit ridge of the Sierra Estrella at Quartz Peak (4,052 feet amsl) in just 3 miles. Along the trail, visitors are treated to a variety of Sonoran Desert plants and wildlife, scenic vistas, and evidence of the area's volcanic history. The views from the summit are expansive—to the west is a dramatic panorama of rugged mountain ranges and desert plains, and to the east metropolitan Phoenix unfolds over the valley of the lower Salt River.

Quartz Peak Trail is extremely steep and difficult to follow in places and is recommended for experienced and well-conditioned hikers only. The trail begins at Quartz Peak Trailhead by following a closed four-wheel-drive track for approximately 0.25 mile. The trail is poorly marked in places and does not extend to the summit; the final 0.25 mile to Quartz Peak is a scramble over boulder and talus slopes that requires careful footing. Quartz Peak is a point on the spine of the Sierra Estrella Mountains capped with an outcrop of white quartz (BLM 2009a).

## 3.15.5 Areas of Critical Environmental Concern

The Lower Gila Terraces and Historic Trails ACEC consists of approximately 82,500 acres. The area of the ACEC that would intersect the SVPP is located at the south end of the Rainbow Valley, stretching from the Sierra Estrella Mountains west to the SDNM (see Figure 3-22). This ACEC was designated in 2012 under the Lower Sonoran RMP (BLM 2012a).

As specified in 43 CFR 1510.7-2, in order for an ACEC to meet relevance and importance criteria, "there shall be present 'significant' historic, cultural, or scenic value; a fish or wildlife resources or other natural system or process; or natural hazard." The Lower Gila Terraces and Historic Trails ACEC was designated to protect historic trail corridors and petroglyphs along the lower Gila River to Yuma County.

Specifically, the trails and landscapes in this ACEC have national significance, as they are part of an important story about the peoples that have lived in, traveled through, and influenced the trail area. The trails and landscapes within the Lower Gila Terraces and Historic Trails ACEC inform society about the broader story of southwestern and transcontinental settlement, communications, and development.

The occupation and use of the Gila River terraces and trails spanned thousands of years, as evidenced by extensive prehistoric village sites and petroglyph sites, as well as associated canals, farmsteads, intaglios,

small campsites, and trails. At least 250 sites have been recorded within the ACEC boundary. Many of the petroglyph panels of the ACEC are a unique and irreplaceable part of America's heritage. More recently, the area served explorers, emigrants, commercial mail and freight companies, 49er gold rush traffic, and the military during the eighteenth- and nineteenth-century western expansion.

The area of the ACEC that would intersect the SVPP encloses a historic travel corridor with portions of the Juan Bautista de Anza NHT, Butterfield Overland Stage Route, Mormon Battalion Trail, and the Gila Trail following the same course along the Gila River floodplain.

The Lower Gila Terraces and Historic Trails ACEC provides habitat for resident and migratory wildlife, but the overall contribution to wildlife habitat diversity is not the primary value of the ACEC. The Lower Gila Terraces and Historic Trails ACEC does provide some connectivity to upland habitats and movement up and down the Gila River, but not in the area of the ACEC that would intersect with the SVPP.

## 3.15.6 National Historic and Scenic Trails

### *3.15.6.1 Juan Bautista de Anza National Historic Trail*

The Juan Bautista de Anza NHT was the first overland route established to connect New Spain (present-day Mexico) with San Francisco (National Park Service 2006). The central Arizona portion of the trail generally follows the Gila River, and an automotive route follows present-day SR 238, located at the southern terminus of the proposed Sonoran Valley Parkway (see Figure 3-22). The trail leaves the Gila River east of the Sierra Estrella Mountains and follows the modern-day SR 238, located approximately 3 miles south of the proposed action alternatives and directly adjacent to the southern terminus of the sub-alternatives of the proposed Sonoran Valley Parkway.

Other historic expeditions or events, including the Butterfield Stage, Mormon Battalion, and pioneer travelers to the 1849 gold rush, followed portions of the trail. The trail is described in more detail in Section 3.3, Cultural and Heritage Resources.

## 3.15.7 Tribal Lands

The Gila River Indian Community is approximately 5 miles east of the proposed action alternatives, east of the Sierra Estrella Mountains (see Figure 3-22). Established in 1939, the Gila River Indian Community encompasses approximately 374,000 acres. The Gila River Indian Community is composed of seven districts, including the Sacaton, Komatke, Santan, and Blackwater Districts, all occurring along the Gila River (Inter-Tribal Council of Arizona 2009).

The Ak-Chin Indian Community is located south of the city of Maricopa, approximately 5 miles east of the southern terminus of the proposed Sonoran Valley Parkway. Established in 1912, the Ak-Chin Indian Community encompasses 22,000 acres (Inter-Tribal Council of Arizona 2009).

# 3.16 NOISE

Sound is created when an object vibrates and radiates part of its energy as acoustic pressure or waves through a medium, such as air, water, or a solid object. Air pressure fluctuations that occur from 20 to 20,000 times per second can be detected as audible sound. The number of pressure fluctuations per second is normally reported as cycles per second, or hertz (Hz). Different vibration frequencies produce different tonal qualities for the resulting sound. Sound levels are expressed in units called decibels (dB).

Decibel scales are a logarithmic index based on ratios between a measured value and a reference value. In acoustics, decibel scales are based on ratios of the actual pressure fluctuations generated by sound waves, compared with a standard reference pressure value of 20 micropascals.

Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hz, is less sensitive to higher and lower sound frequencies, and is least sensitive to sound frequencies below 250 Hz. Measured sound levels are adjusted or weighted to correspond to the frequency-response of human hearing capability and the human perception of loudness. Among several different frequency weighting schemes that approximate the way the human ear responds to noise levels, the "A-weighted" decibel scale (dBA) is the most widely used. The A-weighted scale significantly reduces the measured pressure level for low-frequency sounds while slightly increasing the measured pressure level for some mid-frequency sounds. Most wildlife species have a range of hearing broadly similar to human hearing. Some species, however, can hear sound frequencies above or below the range of human hearing. Most bird species have a range of hearing that is narrower than the human range of hearing.

Noise is generally defined as the undesired component of sound. Varying noise levels are often described in terms of the equivalent constant decibel level. Equivalent noise levels ($L_{eq}$) are used to develop single-value descriptions of average noise exposure over various periods of time. $L_{eq}$ values are not calculated as arithmetic averages but are based on a mean of the acoustic energy represented by a dB value. The mathematics of calculating $L_{eq}$ values give greater weight to the higher noise level values than the lower noise level values. Average noise exposure ratings often include additional weighting factors for potential annoyance due to time of day or other considerations. Average noise exposure over a 24-hour period is often presented as a day-night average sound level ($L_{dn}$). $L_{dn}$ values are calculated from hourly $L_{eq}$ values, with the $L_{eq}$ values for the nighttime period (10 p.m. to 7 a.m.) increased by 10 dBA to reflect the greater disturbance potential from nighttime noises.

Typical noise levels experienced by humans range from 40 dBA (equivalent to a quiet suburban area at night) to 85 dBA (the approximate noise level occurring 5 feet from a gas engine lawn mower). A 3 dBA change in noise level may be perceptible to most listeners, whereas a 10 dBA change may be perceived as a doubling of the noise level. Table 3-20 provides a summary of the range of dBA levels typically encountered in the environment and examples of various noise sources for each range listed.

**Table 3-20.** Typical dBA Levels

| Characterization | dBA | Example Noise Conditions |
|---|---|---|
| Threshold of pain | 130 | Surface detonation, 30 pounds of TNT at 1,000 feet.<br>Peak noise 50 feet behind firing position, M-16 and M-24 rifles. |
| | 125 | Mach 1.9 sonic boom under aircraft at 11,000 feet. |
| Possible building damage | 120 | Air raid siren at 50 feet. |
| Threshold of immediate NIPTS* | 115 | Commercial fireworks (5-pound charge) at 1,500 feet.<br>F/A-18 aircraft takeoff with afterburners at 1,600 feet. |
| | 110 | Peak noise 50 feet behind firing position, .22 caliber rifle.<br>Peak crowd noise, professional football game, inside open stadium. |
| | 105 | Emergency vehicle siren at 50 feet.<br>Pile driver peak noise at 50 feet.<br>Chainsaw (two-stroke gasoline engine) at 3 feet. |
| | 100 | Jackhammer at 10 feet.<br>1-mile-range fog horn at 30 feet. |
| Extremely noisy | 95 | Locomotive horn at 100 feet.<br>2-mile-range foghorn at 100 feet.<br>Large wood chipper processing tree branches at 30 feet. |

**Table 3-20.** Typical dBA Levels (Continued)

| Characterization | dBA | Example Noise Conditions |
|---|---|---|
| 8-hour OSHA limit | 90 | Leaf blower at 5 feet.<br>Jackhammer at 50 feet.<br>Dog barking at 5 feet. |
| Very noisy | 85 | Gas engine lawn mower at 5 feet.<br>Bulldozer, excavator, or paver at 50 feet.<br>Personal watercraft at 20 feet.<br>Pneumatic wrench at 50 feet. |
| | 80 | Forklift or front-end loader at 50 feet.<br>Motorboat at 50 feet.<br>Table saw at 25 feet.<br>Vacuum cleaner at 5 feet. |
| Noisy | 75 | Idling locomotive at 50 feet.<br>Street sweeper at 30 feet.<br>Ocean beach with medium wind and surf. |
| | 70 | Leaf blower at 50 feet.<br>1-mile-range foghorn at 1,000 feet.<br>300 feet from busy six-lane freeway. |
| Moderately noisy | 65 | Typical daytime busy downtown background conditions.<br>Typical gas engine lawn mower at 50 feet.<br>Ocean beach with light wind and surf. |
| | 60 | Typical daytime urban mixed-use area conditions.<br>Normal human speech at 5 feet.<br>Typical electric lawn mower at 50 feet. |
| Moderately noisy | 55 | Typical urban residential area away from major streets.<br>Low noise electric lawn mower at 65 feet. |
| | 50 | Typical suburban daytime background conditions.<br>Open field, summer night with numerous crickets. |
| Quiet | 45 | Typical rural area daytime background conditions.<br>Suburban backyard, summer night with several crickets. |
| | 40 | Typical suburban area at night.<br>Typical whispering at 1 to 2 feet. |
| | 35 | Quiet suburban area at night.<br>Quiet whispering at 1 to 2 feet, low background noise conditions. |
| Very quiet | 30 | Quiet rural area, winter night, no wind.<br>Quiet bedroom at night, no air conditioner. |
| | 25 | Quiet rural area, light wind |
| | 20 | Empty recording studio.<br>Remote area, no audible wind, water, insects, or animal sounds. |
| | 10 | Audiometric testing booth. |
| Threshold of hearing, no hearing loss | 0 | |

* NIPTS: noise-induced permanent threshold shift (permanent hearing damage).

Indicated noise levels are average dBA levels for stationary noise sources or peak noise levels for brief noises and noise sources moving past a fixed reference point. Average and peak dBA levels are not 24-hour $L_{dn}$ values. Decibel scales are not linear. Apparent loudness doubles with every 10 dBA increase, regardless of the initial dBA level. Most adults have accumulated some hearing loss and have a threshold of hearing above 15 dBA. In occupational hearing conservation programs, a threshold of hearing between 20 and 30 dBA is considered normal.

## 3.16.1 Applicable Laws, Regulations, and Policies

The regulation of noise from transportation facilities is accomplished primarily at the federal level with states and municipalities responsible for enforcement. Controls address environmental or land use compatibility.

### *3.16.1.1 Federal Regulations*

The Noise Pollution and Abatement Act of 1970 (Title IV of the CAA [42 USC 7627]) established an Office of Noise Abatement and Control within the EPA. The EPA was directed to investigate and identify the effects of noise levels on public health and welfare, including psychological and physiological effects on humans; effects of sporadic extreme noise as compared with constant noise; effects on wildlife and property; effects of sonic booms on property; and such other matters as may be of interest in the public welfare. Title IV of the CAA also requires other federal agencies and departments to consult with the EPA regarding methods for abating objectionable or nuisance condition noise impacts that result from activities they carry out or sponsor.

The federal Noise Control Act of 1972 (42 USC 4901 *et seq.*) established a requirement that all federal agencies must administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare. The EPA was given the responsibility for providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce (construction equipment; transportation equipment; motors and engines; and electrical or electronic equipment). States and political subdivisions of states retain the right to establish and enforce controls on environmental noise through the licensing, regulation, or restriction of the use, operation, or movement of products or combinations of products. The federal Noise Control Act also directed all federal agencies to comply with federal, state, interstate, and local noise control and abatement requirements to the same extent that any person is subject to such requirements.

Although the EPA can require other federal agencies to justify their noise regulations with respect to the policy requirements of the federal Noise Control Act, each federal agency retains authority to adopt noise regulations pertaining to agency programs.

The Federal Interagency Committee on Urban Noise (FICUN) was formed in 1979 to review various federal agency programs related to noise impacts on land use. The committee included representatives of the Department of Transportation, U.S. Department of Housing and Urban Development (HUD), EPA, Department of Defense, and Veterans Administration. The 1980 report issued by FICUN summarized federal agency noise policies and programs (FICUN 1980). In addition, it identified the $L_{dn}$ noise metric as the most appropriate noise descriptor to use for evaluating noise in the context of land use compatibility issues. The 1980 FICUN report also included a chart of compatible and incompatible noise levels for various categories of land use.

The Federal Interagency Committee on Noise was formed in 1990 to review federal agency policies concerning the assessment of airport noise issues. Participating agencies included the Department of Transportation, Department of Defense, Department of Justice, HUD, EPA, Veterans Administration, and CEQ. The 1992 report prepared by the committee confirmed the use of the $L_{dn}$ noise metric as the primary basis for assessing land use compatibility issues but also recognized that supplementary noise descriptors could be useful to further explain noise impacts on a case-by-case basis. For instance, the FHWA employs the equivalent noise level ($L_{eq}$) for peak activity periods.

Other federal agencies, such as the Federal Transit Administration (FTA) and the Federal Railroad Administration (FRA), have developed noise impact criteria that employ a sliding scale of noise levels, depending on both existing land use and noise levels. Some federal agencies, such as the National Park Service, Forest Service, and BLM, have not adopted any specific noise impact and vibration criteria or standards.

### 3.16.1.2 State and Local Regulations

State regulations focus primarily on noise from motor vehicles and aircraft, as well as equipment operation. Title 28 ARS 16, Section 955, regulates the use of mufflers on equipment and motor vehicles including motorcycles. The AAC does not contain any noise abatement language. ADOT has established noise impact thresholds for different types of land use affected by their transportation facilities. Like ADOT, MDCOT has established a noise guidance and policy document to address the impacts of traffic noise from their facilities for different types of land use.

Local ordinances primarily address noise generated by motor vehicles, animals, and radios and sound amplification devices. Maricopa County Noise Ordinance P-23 (adopted February 15, 2006) states that noise at and above certain levels is detrimental to the health and welfare of Maricopa County citizens. Furthermore, it is in the best interest of its citizens to control noise in a manner that promotes commerce; the use, value, and enjoyment of property; sleep and repose; and environmental quality. The ordinance declares that it is the policy of Maricopa County to prohibit excessive, unnecessary, disruptive, and annoying noise from all sources.

Motor vehicle requirements include the proper and continual use of mufflers; prohibitions against the use of horns, signals, or noise devices on motor vehicles for other than their intended purpose; and excessive engine revving (especially between the hours of 8:00 p.m. and 7:00 a.m.). The ordinance also regulates public disturbances from commercial interests, unless produced in the normal conduct of business within the normal and customary hours of operation and by individuals on public streets and in public places.

Ordinance P-23 exempts 18 source categories of noise, including noise originating from aircraft in flight and from airport activities directly related to flight operations. Noise from emergency vehicles, non-amplified, as well as customary noise from public and private nurseries, daycare facilities, schools, and colleges, is also exempt. Noise from mechanical devices associated with heating and cooling equipment, watercraft and train noise, as well as noise from power plant equipment (during normal hours of operation) and farm equipment noise, is exempt as well.

The City of Goodyear in Chapter 15, Section 4-4P of the City Municipal Code, Required Improvements—Subdivisions, Freeway Development Standards, directs all development located within 500 feet of the I-10 and SR 303L alignment ROWs to develop a sound attenuation plan that includes the following:

1. A noise analysis detailing projected freeway noise levels based on MAG projected levels 15 years from the date of the attenuation plan submittal;
2. Proposed mitigation measures necessary to reasonably predict exterior noise levels consistent with the ADOT residential impact threshold;
3. Certification by a qualified transportation noise analyst regarding the effectiveness of the noise mitigation measures;
4. Measures to reasonably predict that interior noise levels consistent with HUD standards for interior noise levels and adherence to building and material standards prescribed by the City for exterior walls, roof/ceiling assembly, windows, and doors.

The City Municipal Code also includes general nuisance standards similar to those of Maricopa County.

### 3.16.1.3 Thresholds of Significance

Land use compatibility thresholds of significance for roadway traffic noise can be established with either the equivalent $L_{eq}$ noise metric used by FHWA, ADOT, and MCDOT or the 24-hour $L_{dn}$ noise metric implemented by HUD. Local nuisance ordinances are often based on a 24-hour $L_{dn}$ threshold. The $L_{eq}$ equivalent noise level metric is well suited to activities with known (or anticipated) peak activity periods such as morning and evening rush hour traffic to and from the analysis area and the Phoenix metropolitan area. The relevant thresholds for each metric are presented in the sections below; however, the environmental consequences (see Chapter 4) for the proposed Sonoran Valley Parkway on the ambient noise environment will be examined with respect to the $L_{eq}$ noise metric only.

#### *HUD Standards*

Noise has two different types of effects on people: the direct physical effects such as hearing loss, and the less direct effects of interference with activities such as sleep and conversation. The standards contained in the HUD noise regulation are based on levels that can cause interference effects, not on the levels that can cause hearing loss.

HUD noise guidelines are based on a series of surveys compiled in *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). Most of the surveys indicated that there were two breakpoints in reported interference and annoyance. Below 55 $L_{dn}$, there was very little interference (for example, speech intelligibility was greater than 99%) and very little resulting annoyance. Over 65 $L_{dn}$, interference and annoyance both increase rapidly.

The EPA set 55 $L_{dn}$ as the basic goal. But other federal agencies, including HUD, in consideration of their own program requirements and goals as well as the difficulty of actually achieving a goal of 55 $L_{dn}$, have settled on 65 $L_{dn}$ as the standard.

At 65 $L_{dn}$, activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be expected to be achieved. Following the federal lead, most local jurisdictions that have adopted noise standards have adopted 65 $L_{dn}$ as the breakpoint for acceptability. Table 3-21 summarizes the HUD acceptability standards.

**Table 3-21.** Housing and Urban Development Site Acceptability Standards

| | Day-Night Average Noise Level (dB) | Special Approvals and Requirements |
|---|---|---|
| Acceptable | Not exceeding 65 dB* | None |
| Normally unacceptable | Above 65 dB but not exceeding 75 dB | Special approvals,† environmental review,† attenuation‡ |
| Unacceptable | Above 75 dB | Special approvals,‡ environmental review,‡ attenuation |

* Acceptable threshold may be shifted to 70 dB in special circumstances, pursuant to 24 CFR 51.105(a).

† See 24 CFR 51.104(b) for requirements.

‡ 5 dB additional attenuation required for sites above 65 dB but not exceeding 70 dB; 10 dB additional attenuation required for sites above 70 dB but not exceeding 75 dB (24 CFR 51.104[a]).

### *Federal Highway Administration, Arizona and Maricopa County Departments of Transportation, and City Standards*

The FHWA has issued regulations for noise evaluation in 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise. The main objectives of 23 CFR 772 are "to provide procedures for noise studies and noise abatement measures, to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23, United States Code." According to FHWA regulations, a traffic noise impact occurs when the predicted traffic noise level approaches or exceeds the Noise Abatement Criteria (NAC) for the specified land use. In addition, an impact occurs when the predicted traffic noise level substantially exceeds the existing noise level.

Noise level impact criteria may be based on a threshold, the change in noise level from the existing noise level, or both. Table 3-22 shows the FHWA-defined NAC for various land use categories. The NAC for Category B, which includes homes, churches, schools, and parks, is 67 dBA.

**Table 3-22.** Noise Abatement Criteria

| Land Use Category | Noise Level $L_{Aeq1h}$* dBA | Description of Land Use |
|---|---|---|
| A | 57 dBA (exterior) | Land on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks, or open spaces that are recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. |
| B | 67 dBA (exterior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, playgrounds, active sports areas, and parks. |
| C | 72 dBA (exterior) | Developed lands, properties, or activities not included in Categories A and B above. |
| D | – | Undeveloped lands. |
| E | 52 dBA (interior)† | Residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. |

Source: 23 CFR 772.

Note: Noise abatement criteria are from FHWA-defined land use categories and NAC (23 CFR 772).

* $L_{Aeq1h}$ is the 1-hour equivalent sound level.

† The interior sound level (activity) applies to 1) indoor activities for those parcels where an exterior noise sensitive activity is identified, and 2) those situations in which the exterior activities will not be affected by the noise, but the interior activities will be affected.

Each state may define the levels at which the noise "approaches" the criteria and when it "substantially exceeds" the existing noise level. The ADOT (2005) Noise Abatement Policy (NAP) determines the noise level impact for Category B land uses when the noise level "approaches" within 3 dBA of the FHWA NAC, or 64 dBA, and considers mitigation for customer locations where the predicted highway traffic noise level is equal to or greater than 64 dBA. ADOT also considers mitigation if the noise level from the transportation improvement project is predicted to increase substantially. A substantial noise level increase is equal to or greater than 15 dBA.

According to MCDOT (2008a) Policy Document #T3103, *Noise Abatement*, noise abatement should be considered if noise levels reach 66 dBA or higher at noise-sensitive properties adjacent to their facilities. Additionally, mitigation measures will be considered for noise-sensitive properties if predicted traffic noise levels substantially exceed existing levels. "Substantially exceed" is defined as a 15 dBA increase between the existing noise levels and the future noise levels, just like in the ADOT definition.

The City's Zoning Ordinance, Article 9, Special District, Freeway Development Overlay District, applies the ADOT Category B land use impact threshold of 64 dBA as the appropriate exterior noise level for residential areas within the city limits and within 500 feet of I-10 and SR 303L. The standards contain similar language found in the ADOT (2005) NAP regarding noise analysis methodology, minimum noise reduction (5 dBA or more), and suggested maximum noise wall heights (20 feet above grade). The City standards for interior noise levels apply the HUD 45 dBA interior noise level threshold. These development standards will be referenced in the determination of environmental consequences for the action alternatives.

### *Other Standards*

The FTA and FRA noise criteria are based on a comparison of the transit system noise with the outdoor ambient noise from other sources in the community. They incorporate both absolute criteria, which consider annoyance caused by the transit system alone, and relative criteria, which consider annoyance as a result of the change in noise environment caused by the transit system.

The FTA guidance manual *Transit Noise and Vibration Impact Assessment* establishes noise impact criteria on the basis of cumulative, A-weighted noise exposure, using either the $L_{eq}$ or $L_{dn}$ noise metric (FTA 1995). $L_{dn}$ is applied to residences and other buildings where people normally sleep, and $L_{eq}$ is applied to all other noise-sensitive land use categories.

Two levels of noise impact are included in the FTA criteria as follows:

- Severe. Severe noise impacts are considered "significant" as this term is used in NEPA and implementing regulations. Noise mitigation will normally be specified for severe impact areas unless there is no practical mitigation measure.
- Impact. In this range, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation. These other factors can include the predicted increase over existing noise levels, the types and numbers of noise-sensitive land uses affected, existing outdoor-to-indoor sound insulation, and the cost effectiveness of mitigating noise to more acceptable levels.

Transit improvements are not associated with the project; therefore, FTA and FRA regulations are not germane to the discussion of applicable noise standards. However, the Southern Pacific Railroad (SPRR) owns a rail line that runs south of and parallel to SR 238 , near the southern end of the project area. The rail line is located outside the limits of the action alternatives for the SVPP, as currently proposed. If the final design of the selected alternative alignment incorporates an at-grade crossing of the SPRR, these criteria would need to be considered in the location of the crossing and any potential mitigation measures.

## 3.16.2 Analysis Area

The analysis area (location of the three action alternatives and two sub-alternatives) is bounded on the northeast and east by the Sierra Estrella Mountains, Estrella Mountain Regional Park, and the Gila River Indian Community and on the west and southwest by the SDNM. Land ownership includes the BLM, ASLD, and private owners.

The analysis area for assessing noise impacts of a new Parkway alignment or modified existing alignment is defined by the location of Category B land uses and other noise-sensitive land uses (such as Category A) located within 300 to 500 feet of the proposed ROW for the project, especially in urban areas. For projects in rural areas, such uses located within 1,000 feet of the proposed ROW are an acceptable

approach to establish the affected environment and assess future environmental consequences. A 1,000-foot perimeter was placed around the 250-foot-wide ROW associated with Alternatives A, C, and H, and Sub-alternatives F and G. Figure 3-23 shows the perimeter around the ROW for each of the proposed action alternatives. Because of the sparse development in the analysis area, three Category B land uses are located within the 1,000-foot perimeter: two residences and one park (the eastern boundary of the SDNM). Therefore, the analysis area is more appropriately set at the perimeter of each 1-mile section crossed by each of the three action alternatives.

Category B land uses within the analysis area for noise include 44 detached single-family residences and/or mobile homes and one school. The housing icons (R1 to R5) in Figure 3-23 indicate the general location of the residences. R1 represents one residence located within Township 4 South, Range 1 East, Section 21 that lies within an undeveloped plat for Tangier Acres and approximately 0.5 mile north of SR 238. R2 represents one residence located in Township 3 South, Range 1 West, Section 21. R3 represents five residences located east of Bullard Avenue in Township 3 South, Range 1 West, Section 9. R4 represents 16 residences located east of 171st Avenue in Township 3 South, Range 2 West, Section 1. R5 represents five residences located east of Rainbow Valley Road in Township 2 South, Range 1 West, Section 35 and 16 residences located west of Rainbow Valley Road in Township 2 South, Range 12 West, Section 34.

The school is the Mobile Elementary School, located east of 99th Avenue along westbound SR 238 and within the analysis area. Two commercial uses (Category C) also exist within the analysis area. The Butterfield Station Landfill is located in Township 4 South, Range 1 East, Section 18, which is approximately 0.75 mile north of R1. Another commercial use is located in Township 3 South, Range 2 West, Section 10, approximately 1 mile west of Rainbow Valley Road. Portions of the SDNM located within the analysis area for air quality begin at the divergence of all three action alternatives in Township 4 South, Range 1 West, Section 13 and end at the convergence of all three action alternatives in Township 2 South, Range 2 West, Section 34.

## 3.16.3 Ambient Conditions

Short-term noise level measurements were completed on August 20, 2009, to describe the existing noise environment. Measurements were taken between approximately 8:30 a.m. and 10:00 a.m. at the south end of the analysis area, near SR 238, and between approximately 11:30 a.m. and 2:30 p.m. at the north end of the analysis area, near the intersection of Riggs and Rainbow Valley Roads, with additional measurements taken in the vicinity of the proposed action alternatives to the south and east.

The equipment used for the noise-level measurements is a Larson Davis Model 820 precision integrating sound-level meter (SLM). The SLM was calibrated in the field before use with a Larson Davis Model CAL-200 acoustical calibrator. The SLM complies with the American National Standards Institute S1.4-1971 for a Type 1 SLM. The methodology used for the sound-level measurement follows the procedures specified in Section 4 of FHWA-PD-96-046/DOT-VNTC-FHWA-96-5, *Measurement of Highway-Related Noise* (FHWA 1996).

The measurement locations shown in Figure 3-23 are numbered sequentially from southeast (the beginning of the analysis area) to northwest (the end of the analysis area), with the letter M for measurement as a prefix. Six total measurements were recorded at locations in the vicinity of four occupied houses, one demolished home site, and a school located within the bounds of the noise analysis. A summary of each short-term noise level measurement is presented in Table 3-23.

The temperature at the time of the morning noise level measurements was approximately 95°F to 100°F, with the relative humidity at 31% to 38% and calm wind conditions (0 to 2 mph average wind speed).

The temperature at the time of the midday noise-level measurements was approximately 104°F to 107°F, with the relative humidity at 23% to 34% and calm wind conditions (0 to 3 mph average wind speed).

Measured equivalent noise levels ($L_{eq}$) ranged from 61.6 to 68.5 dBA at M1, located in the vicinity of the Mobile Elementary School on the dirt shoulder approximately 20 feet north of the SR 238 westbound edge of the pavement. A train pass-by on the SPRR line, located approximately 175 feet south of SR 238, occurred during the end of the second measurement sample interval and the beginning of the third measurement sample interval. Maximum noise levels of 81.6 and 84.2 dBA, respectively, were recorded. The 61.6 dBA $L_{eq}$ recorded during the first measurement sample is more typical of a rural noise environment, although noise levels likely increase during sustained peak traffic periods in this location.

Measured $L_{eq}$ ranged from 42.0 to 49.1 dBA at M2, located near the undeveloped Tangier Acres subdivision plat, approximately 0.5 mile north of M1 and east of 99th Avenue. A truck pass-by on 99th Avenue occurred during the beginning of the first measurement sample interval, and a maximum noise level of 67.7 dBA was recorded. The 42.0 and 45.1 dBA $L_{eq}$ recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment somewhat removed from any consistent traffic or other noise source. Currently, 99th Avenue is unpaved and does not carry significant vehicle traffic, as evidenced by the single vehicle pass-by that occurred during the entire 32-minute measurement period at this location.

Measured $L_{eq}$ ranged from 39.7 to 48.8 dBA at M3, located near a detached single-family farm house that is approximately 3 miles south of Patterson Road and 0.5 mile east of Bullard Avenue. Wind gusts up to 9 mph occurred during the first measurement sample interval, and a maximum noise level of 65.7 dBA was recorded. The 43.1 and 39.7 dBA $L_{eq}$ recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment completely removed from any consistent traffic or other noise source.

Measured $L_{eq}$ ranged from 52.9 to 61.4 dBA at M4, located near a detached single-family house on Patterson Road that is 0.5 mile east of Bullard Avenue. The range in recorded noise levels is typical of a suburban to urban residential noise environment, although this location is completely removed from any consistent traffic or other noise source. Noise events that occurred during the measurement period explain the increase in equivalent ($L_{eq}$) noise levels over those expected for a remote location. Dogs at the residence were barking during the entire second measurement sample interval, and a maximum noise level of 70.2 dBA was recorded. Small-aircraft flyovers occurred during the first and third measurement sample intervals.

Measured $L_{eq}$ ranged from 37.8 to 48.2 dBA at M5, located near a detached single-family house and two mobile homes east of 171st Avenue, 0.5 mile south of Hunt Highway and 1 mile east of Rainbow Valley Road. A small-aircraft flyover occurred during the beginning of the first measurement sample interval, and a maximum noise level of 66.5 dBA was recorded. The 41.7 and 37.8 dBA $L_{eq}$ recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment somewhat removed from any consistent traffic or other noise source.

Measured $L_{eq}$ ranged from 38.8 to 47.0 dBA at M6, located near the demolished remnants of a detached single-family house on the southwest corner of Rainbow Valley and Riggs Roads. A car engine was idling in the background during the entire first measurement sample interval and the beginning of the second measurement sample interval. A maximum noise level of 56.5 dBA was recorded. The 41.4 and 38.8 dBA $L_{eq}$ recorded during the second and third measurement samples, respectively, is more typical of a rural noise environment without any consistent traffic or other noise source.

**Table 3-23.** Summary of Noise Levels (in dBA) at Monitoring Sites within the Analysis Area

| August 20, 2009 | | | | | | |
|---|---|---|---|---|---|---|
| **Site ID*** | **Sample** | **Begin Time** | **End Time** | **$L_{eq}$** | **$L_{min}$** | **$L_{max}$** |
| M1 | 1 | 8:28 a.m. | 8:38 a.m. | 61.6 | 37.1 | 78.2 |
| | 2 | 8:49 a.m. | 8:59 a.m. | 68.5 | 38.1 | 81.6† |
| | 3 | 9:02 a.m. | 9:12 a.m. | 66.3 | 35.5 | 84.2† |
| M2 | 1 | 9:26 a.m. | 9:36 a.m. | 49.1 | 31.0 | 67.7‡ |
| | 2 | 9:37 a.m. | 9:47 a.m. | 42.0 | 27.9 | 55.4 |
| | 3 | 9:48 a.m. | 9:58 a.m. | 45.1 | 31.7 | 55.4 |
| M3 | 1 | 1:09 p.m. | 1:10 p.m. | 48.8 | 30.4 | 65.7§ |
| | 2 | 1:20 p.m. | 1:30 p.m. | 43.1 | 23.4 | 58.3 |
| | 3 | 1:31 p.m. | 1:41 p.m. | 39.7 | 22.1 | 52.2 |
| M4 | 1 | 1:52 p.m. | 2:02 p.m. | 53.2 | 42.6 | 61.8 |
| | 2 | 2:03 p.m. | 2:13 p.m. | 61.4 | 39.8 | 70.2¶ |
| | 3 | 2:14 p.m. | 2:24 p.m. | 52.9 | 39.5 | 62.5 |
| M5 | 1 | 12:11 p.m. | 12:21 p.m. | 48.2 | 24.9 | 66.5** |
| | 2 | 12:32 p.m. | 12:42 p.m. | 41.7 | 26.1 | 55.4 |
| | 3 | 12:43 p.m. | 12:53 p.m. | 37.8 | 24.8 | 51.0 |
| M6 | 1 | 11:27 a.m. | 11:37 a.m. | 47.0 | 45.1 | 54.1†† |
| | 2 | 11:38 a.m. | 11:48 a.m. | 41.4 | 25.7 | 56.5†† |
| | 3 | 11:49 a.m. | 11:59 a.m. | 38.8 | 24.7 | 54.2 |

Notes: $L_{eq}$ = equivalent continuous noise level (slow response setting).

$L_{max}$ = maximum sound level (slow response setting).

$L_{min}$ = minimum sound level (slow response setting).

* Site ID indicating noise measurement location is shown in Figure 3-23.

† SPRR train pass-by at 8:57 a.m.

‡ Truck pass-by at 9:28 a.m.

§ Winds reached a 9 mph maximum during measurement interval.

¶ Dogs barking during entire measurement interval.

** Small-aircraft flyover at 12:11 p.m.

†† Car idling in background.

# 3.17 HAZARDOUS MATERIALS AND PUBLIC SAFETY

SWCA completed a Phase I Environmental Site Assessment (Phase I ESA) for Alternative A of the SVPP in October 2007 and completed Phase I ESAs for Alternatives B and C of the SVPP in July 2009 (SWCA 2007, 2009c, 2009d). The purpose of the Phase I ESAs was to perform environmental due diligence to identify potential sources of contamination that could affect construction or operation of the proposed action alternatives. Per American Society for Testing and Materials (ASTM) Standard 1527.00, an additional Phase I ESA may be required upon the approval of the POD.

The Phase I ESAs followed the standards described in the ASTM 2005 Standard E 1527-05, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. Deletions or deviations from ASTM Standard E 1527-05 were documented in these reports. The objective of the Phase I ESAs was to assess the proposed action alternatives, to the extent practical, for the potential presence of recognized environmental conditions, defined in the ASTM standard as “the presence or

likely presence of hazardous materials or petroleum products under conditions that indicate an existing release, a past release, or material threat of a release of any hazardous substances or petroleum products into structures on the property, or into the ground, groundwater, or surface water of the property." The term is not intended to include de minimis conditions, which generally do not present risks of harm to public health or the environment and which generally would not be the subject of enforcement actions if brought to the attention of appropriate regulating agencies.

The Phase I ESAs did not include activities such as inspections or sampling for the presence of asbestos-containing materials, radon or other radioactive substances, vapor intrusion, lead-based paint, non-hazardous wastes and materials, mold, or biological and medical wastes. No soil, air, or water samples were collected for these Phase I ESAs.

To achieve the objective referenced above, SWCA completed the following tasks:

- reviewed intermittent topographic maps and/or aerial photographs dating from 1937 to 2009;
- surveyed relevant documents in order to assess the project's physiography, including a review of the local hydrogeology and geology of the surrounding area;
- reviewed available federal and state regulatory databases; and
- visually surveyed the area of the proposed action alternatives by walking on and driving around the analysis area, and visually surveyed the surrounding properties.

## 3.17.1 Applicable Laws, Regulations, and Policies

In 2005, the EPA issued its final rule defining the scope of "all appropriate inquiry" to be conducted prior to property acquisition in order to qualify for certain defenses under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (or "Superfund"). The EPA's rule increased the burdens on prospective purchasers of property to investigate past uses and possible releases of hazardous substances. The EPA allows for the requirements of the rule to be satisfied by compliance with ASTM Standard E 1527- 05. To this end, a Phase I ESA was conducted for each of the proposed action alternatives. The results of the Phase I ESA are discussed in Sections 3.17.2 to 3.17.4.

The Resource Conservation and Recovery Act, as amended by Federal Facility Compliance Act of 1992 (42 USC 6901–6992) (RCRA), authorizes the EPA to manage, by regulation, hazardous wastes on active disposal operations. It waives sovereign immunity for federal agencies with respect to all federal, state, and local solid and hazardous waste laws and regulations, and makes federal agencies subject to civil and administrative penalties for violations, and to cost assessments for the administration of the enforcement.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601–9673) (CERCLA), provides for liability, risk assessment, compensation, emergency response, and cleanup (including the cleanup of inactive sites) for hazardous substances. It requires federal agencies to report sites where hazardous wastes are or have been stored, treated, or disposed of and requires responsible parties, including federal agencies, to clean up releases of hazardous substances.

The Community Environmental Response Facilitations Act of 1992 (42 USC 9620[h]) is an amendment to CERCLA. The 1992 act expands on the risk assessment requirements for land transfers and disposal.

The Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 11001–11050) (EPCRA) requires the private sector to inventory chemicals and chemical products, to report those in excess of threshold planning quantities, to inventory emergency response equipment, to provide annual reports and

support to local and state emergency response organizations, and to maintain a liaison with the local and state emergency response organizations and the public.

The Pollution Prevention Act of 1990 (42 USC 13101–13109) requires and encourages prevention and reduction of waste streams and other pollution through minimization, process change, and recycling. It encourages and requires development of new technology and markets to meet the objectives.

Under ARS 49-99, 49-929, and 49-930, the State refers to the requirements to establish a hazardous waste program equivalent to and consistent with the federal hazardous waste program promulgated under RCRA Subtitle C. This subtitle establishes reporting requirements for the generation, storage, handling, transport, and disposal of hazardous waste. Certain waste materials generated at mining sites, however, are excluded from Subtitle C under the Bevill Amendment of 1980. Although the Bevill Amendment exempts much of the waste generated at mining facilities, hazardous waste generators activities that are "not unique" to the mining industry are subject to RCRA Subtitle C, such as hazardous waste generated from equipment servicing and repair and laboratory wastes that meet the criteria for hazardous waste under 40 CFR 262. On-site accumulation in excess of the requirements under 40 CFR 262.34 would require a storage permit. In some cases, on-site treatment or disposal would require a hazardous waste permit.

Table 3-24 presents permits or regulatory actions and the laws and statutes related to the production, transportation, storage, and disposal of toxic or hazardous materials in Arizona that may apply to the SVPP.

**Table 3-24.** Permits, Laws, and Regulatory Codes Related to Facilities that Produce, Transport, Store, or Dispose of Toxic or Hazardous Materials in Arizona

| Permit or Regulatory Action | Regulation |
|---|---|
| Hazardous Waste Permit | • ARS 49-921<br>• AAC R18-8-260 |
| EPA Identification Number | • ARS 49-922 |
| Pollution Prevention Plan | • ARS 49-961 through 49-973 |
| Hazardous Waste Management Facility—Annual Registration | • ARS 49-929<br>• ARS 49-930 |
| Emergency and Community Right to Know | • 42 USC 11001 *et seq.*<br>• 42 USC 11023 (EPCRA 313)<br>• 40 CFR 372 |
| Toxic Data Report | • ARS 49-963<br>• ARS 49-964<br>• ARS 49-971<br>• ARS 49-973 |
| Solid Waste Annual Report | • ARS 49-860 |
| Solid Waste Special Waste Facilities Plan Approval | • ARS 49-761 *et seq*. for Solid Waste<br>• ARS 49-851 *et seq*. for Special Waste<br>• ARS 49-857.01<br>• ARS 49-241 *et seq*. governs the Aquifer Protection Permit Program |

## 3.17.2 Analysis Area

The hazardous materials and public safety analysis area for this project includes the alternative alignments' 250-foot ROW and the additional search distances specified in ASTM Standard E 1527-05 (ASTM 2005). These search distances have been determined by ASTM to be appropriate distances in which to search for potential sources of contamination that could affect the project area (Table 3-25).

**Table 3-25.** Hazardous Materials Analysis Areas

| Environmental Record Source | Approximate Minimum Analysis Area (mile) |
|---|---|
| Federal NPL | 1.0 |
| Federal Delisted NPL | 0.5 |
| Federal CERCLIS | 0.5 |
| Federal CERCLIS NFRAP | 0.5 |
| Federal RCRA CORRACTS | 1.0 |
| Federal RCRA non-CORRACTS TSD | 0.5 |
| Federal RCRA Generators | 250-foot ROW and adjacent properties |
| Federal IC/EC | 250-foot ROW |
| Federal ERNS | 250-foot ROW |
| State and Tribal Hazardous Waste Sites (NPL Equivalent) | 1.0 |
| State and Tribal Hazardous Waste Sites (CERCLIS Equivalent) | 0.5 |
| State and Tribal Landfill and/or Solid Waste Disposal Sites | 0.5 |
| State and Tribal LUST | 0.5 |
| State and Tribal Registered UST | 250-foot ROW and adjacent properties |
| State and Tribal IC/EC | 250-foot ROW |
| State and Tribal Voluntary Cleanup (VCP) Sites | 0.5 |
| State and Tribal Brownfield Sites | 0.5 |

CERCLIS = Comprehensive Environmental Response, Compensation, and Liability Information System
CORRACTS = Corrective Action Sites
ERNS = Emergency Response Notification System
IC/EC = Institutional Controls / Engineering Controls
LUST = leaking underground storage tank
NFRAP = no further remedial action planned
NPL = National Priorities List
RCRA = Resource Conservation and Recovery Act
TSD = Treatment, Storage, and Disposal
UST = underground storage tank

## 3.17.3 Records Review

Environmental database reports generated by Environmental Data Resources, Inc. (EDR), were used to access environmental records for the project and the surrounding properties. The proximity of listed facilities was reviewed to determine the potential effect, if any, these facilities may have on the SVPP. The 69 databases searched by EDR include those specified by ASTM Standard E 1527-05, as well as several additional federal and state databases, and databases proprietary to EDR. EDR updates its records in accordance with ASTM Standard E 1527-05 guidelines. Additional listed facilities that EDR has not

identified may exist within a 1-mile radius. SWCA also accessed the ADEQ Interactive GIS eMaps website to search state environmental databases (ADEQ 2009c). Figure 3-24 shows the mapped locations of listed sites relative to the project area.

Mobile Elementary School was listed in the Leaking Underground Storage Tank (LUST) database. A leak was reported in late 1998, and the site was closed in June 2000, with soil levels meeting Tier 1 standards. This school is located at 42798 South 99th Avenue in Mobile, approximately 0.25 to 0.5 mile northeast and downgradient of the project.

Hamilton Homes Property was listed in the Underground Storage Tank (UST) and LUST databases. A leak was reported in January 1999, and the site was closed in January 2007, with soil levels meeting Tier 1 standards. The tanks were permanently removed in May 2006. This site is located on the southwest corner of Rainbow Valley and Riggs Roads, possibly adjacent to and upgradient of the project.

Two additional sites were revealed by the ADEQ online database search: Butterfield Station Landfill, and RM Cat Environmental Services Remediation Site. The Butterfield Station Landfill and Solid Waste Transfer Station is located downgradient of the project area, nearly adjacent to the east of the southern terminus of the proposed Sonoran Valley Parkway. This active landfill (AZ Solid Waste Facility No. 07032700.01, EPA ID No. AZD983481813) is operated by Waste Management, Inc., and handles wastes, including municipal solid waste, biosolids, construction and demolition debris, drums, industrial and special waste, and CERCLA (or "Superfund") waste.

RM Cat Environmental Services Remediation Area is mapped in the immediate vicinity of or possibly on the project area. The remediation area may be located in an area that is common to all action alternatives; however, the exact location of the remediation area is unknown. RM Cat Environmental Services is now called Balfor Environmental, a company for which train derailments and spill cleanup represent a significant portion of business. This site is mapped in the vicinity of railroad tracks and may indicate a past spill of unknown type and size. Aerial photography does not indicate large, disturbed soil areas in the mapped area, and no large, disturbed soil areas were observed during SWCA's site reconnaissance. The site was listed with a status of "not active" on October 31, 2006.

In addition to the sites and facilities listed in the EDR report, EDR provided a list of sites and facilities that could not be mapped because of incomplete address or location information; these are called orphan sites. These facilities are listed in one or more regulatory agency databases but do not have enough address information to be located by EDR. The EDR report identified 61 orphan sites. All 61 listings were deemed to be not relevant because of their status and/or location with respect to the project area.

## 3.17.4 Site Reconnaissance

Site reconnaissance for the Phase I ESA site investigations for Alternative A of the SVPP was completed on September 19, 2007, and for Alternatives B and C of the SVPP on May 27, 2009 (SWCA 2007, 2009c, 2009d). The project area was accessed from public thoroughfares and by walking through areas that were inaccessible to vehicles.

The project consists primarily of undeveloped desert land, but it also crosses maintained gravel roads and a natural gas pipeline and crosses under two power lines. The project area lies entirely within the Rainbow Valley sub-basin, a large, valley-wide creosote flat. There is also a small segment of the project area that crosses an agricultural field and irrigation canal. The field and canal both appear inactive. The project area contains other segments of minor development: in the north end, where the project corridor overlaps Rainbow Valley Road, there is a gravel/dirt roadway.

A recently constructed steel high-voltage electric transmission line crosses the project in Township 4 South, Range 1 East, Section 18. The area underneath and to the south of this line has been cleared of vegetation. A natural gas pipeline runs parallel to and south of the electric line and crosses through the project area in the same area as the power line. A maintenance road and a graded corridor of land separate the gas and electric lines.

No evidence of surface contamination from hazardous material spills or leaks, or petroleum-based liquids, was observed on the project. A small amount of debris was observed on the project that included de minimis debris items, such as windblown trash, aluminum cans, glass bottles, broken cinder blocks, scrap metal, and several tires.

Although several wells were listed in the ADWR well database as being near the project area, no wells were observed within the corridor during the site visit. No evidence of historical structures was observed on the project area.

The vicinity of the project area consists primarily of vacant, undeveloped desert land. Vegetation is sparse and typical of the region. Unimproved roads transect the vicinity in places, and the community of Mobile is located southeast of the project area.

## 3.17.5 Recognized Environmental Conditions

SWCA completed Phase I ESAs of the three action alternatives in conformance with the scope and limitations of ASTM Standard E 1527-05 and certain additional limitations. Based on the information obtained during the site reconnaissance, conducted on September 19, 2007, and on May 27, 2009, and the information obtained through the activities of this Phase I ESA, excluding the limitations, one recognized environmental condition was identified. Portions of the project have been used for farming in the past; therefore, pesticides may be present in the soil on the project area from the historical use of pesticides.

## 3.17.6 Public Safety

Following is a brief discussion of the various public health and safety issues for the analysis area. The health and safety concerns present within the analysis area are both natural and human-caused and may pose risks for individuals visiting or working within the area. Many of these topics, such as air quality, soils, recreation, and transportation, have been described more fully in the preceding sections.

## 3.17.7 Applicable Laws, Regulations, and Policies

The construction of the Parkway must be in conformance with OSHA regulations set forth in 29 CFR 1926. The Occupational Safety and Health Act of 1970 (PL 91-596) created OSHA. The act requires employers to do the following:

- maintain conditions or adopt practices reasonably necessary and appropriate to protect workers on the job;
- be familiar with and comply with standards applicable to their establishments; and
- ensure that employees have and use personal protective equipment when required for safety and health.

The Emergency Planning and Community Right-to-Know Act of 1986 (42 USC 11001–11050) requires the private sector to inventory chemicals and chemical products, report those in excess of threshold

planning quantities, inventory emergency response equipment, provide annual reports and support to local and state emergency response organizations, and maintain a liaison with the local and state emergency response organizations and the public.

The Pollution Prevention Act of 1990 (42 USC 13101–13109) requires and encourages prevention and reduction of waste streams and other pollution through minimization, process change, and recycling. It encourages and requires development of new technology and markets to meet the objectives.

*Floodplain Regulations for Maricopa County* (FCDMC 2006) is the current guiding document for development within floodplains in Maricopa County.

## 3.17.8 Flood Control

As noted in Section 3.8, the action alternatives are in an area that receives shallow sheet flow and channelized flow during large storm events (V3 2007). The flood insurance rate maps (FIRMs) for Maricopa County indicate that portions of the project area are located in 100- and 500-year floodplains, as designated by FEMA. Development within FEMA floodplains is strictly regulated by both the City and Maricopa County (see Figure 3-12).

The City General Plan recommends mitigation measures for development within floodplains. These mitigation measures include buffer areas, filling/grading, and reinforced and/or elevated structure foundations. Available development options include dedicating potential flood areas as passive and/or active open space. If development and construction are chosen for the area, reducing flood impacts with flood abatement construction must be incorporated, even though these construction efforts can increase development costs (City 2003).

In Maricopa County, if a property is located within a FEMA floodplain, the property owner is required to have flood insurance. In addition, the property owner must apply for a floodplain use permit to make any changes to their property, including new development. FCDMC enforces floodplain regulations, which regulate the location and construction of buildings and other development within designated floodplains. FCDMC has delegated floodplain regulation and enforcement occurring within Goodyear city limits to the City. FCDMC is required to ensure that structures or improvements in the floodplain will not cause adverse impacts to properties upstream or downstream (FCDMC 2006).

## 3.17.9 Area Hazards

Area hazards are dominated by geological and transportation hazards, as well as potential hazards associated with undeveloped desert lands in the region (see Section 3.5 for geological hazards).

### *3.17.9.1 Transportation Hazards*

Currently, residents in and around the community of Mobile and the City of Maricopa have only two viable options for commuting to and from the greater Phoenix area. They can either use a combination of SR 238, SR 347, and I-10, or a combination of MC 85 and I-10. Because these routes are not direct, they can cause significant delays to the response time of emergency vehicles in the area. The City considers the proposed Sonoran Valley Parkway essential to providing emergency access.

Some residents of Mobile, as well as others from outside the community, have been using the unpaved maintenance access road that parallels the EPNG pipeline to travel to and from Mobile and the greater Phoenix metropolitan area. The maintenance road runs northwest-southeast and generally parallels the

eastern boundary of the SDNM; public use of this road is not authorized by EPNG. There are four existing pipe natural gas pipelines buried directly beneath the maintenance road; in places they lie only inches beneath the surface of the road. This poses a safety threat to the vehicles driving over them.

There are also two other unpaved access roads that are within the analysis area—the Transwestern Pipeline access road and the El Paso Transmission Line access road. These are relatively new lines and access roads but also enable a degree of unauthorized access between Mobile and southern Goodyear. None of the action alternatives actually intersect these access roads; however, if one of the action alternatives is implemented, construction of the SVPP could alleviate some of the traffic concerns along these roads.

### 3.17.10 Recreation Safety

The analysis area consists of hundreds of acres of natural desert, areas that are typically exposed to OHV traffic. OHV use can pose potential safety concerns for those using the vehicles. OHV traffic can also contribute to potential air quality issues in the immediate area of use as a result of increased particulate matter, particularly $PM_{10}$ and $O_3$. As was discussed in more detail in Section 3.2, $PM_{10}$ and $O_3$ can be inhaled into the lungs and cause health problems, including asthma.

## 3.18 SOCIAL AND ECONOMIC CONDITIONS

The scope of the analysis for social and economic resources includes a discussion of current social and economic data relevant to the proposed project, including population, demographics, employment, income, and taxes in the analysis area. State, county, municipal, and census tract data are also included to provide a comparative discussion for the analysis area.

Information in this section was obtained from various sources, including the Census Bureau, State of Arizona, and Sonoran Institute Economic Profile System (EPS) database, which uses different sources of information, such as Bureau of Economic Analysis and Arizona state data.

### 3.18.1 Applicable Laws, Regulations, and Policies

The BLM (2005a) *Land Use Planning Handbook* (H-1601-1) specifies that the social and economic environment must be considered for all BLM land use planning decisions. Additionally, in accordance with this handbook, by statute, regulation, and EO, the BLM must use social science in the preparation of informed, sustainable land use planning decisions. Further, as noted in the BLM (2008b) NEPA Handbook (H-1790-1), socioeconomic issues typically occur within communities located outside BLM-managed lands. Nevertheless, the BLM must analyze the impacts of a given decision or project on the social and economic resources of a community or region.

Section 202(c)(2) of FLPMA requires BLM to integrate physical, biological, economic, and other sciences in developing land use plans (43 USC 1712[c][2]). FLPMA regulations 43 CFR 1610.4-3 and 4-6 also require BLM to analyze social, economic, and institutional information. Section 102(2)(A) of NEPA requires federal agencies to "insure the integrated use of the natural and social sciences… in planning and decision making" (42 USC 4332[2][A]). Federal agencies are also required to "identify and address…disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States" in accordance with EO 12898 on environmental justice.

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed by President Clinton in 1994. The EO requires agencies to advance environmental justice by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means such groups should not bear a disproportionately high share of negative environmental consequences from federal programs, policies, decisions, or operations. Meaningful involvement means federal officials actively promote opportunities for public participation, and federal decisions can be materially affected by participating groups and individuals.

The Lower Sonoran RMP (BLM 2012a) provides information on and analyzes the social and economic conditions of the planning area where this project would be located. As discussed in the 2012 RMP, BLM management decisions have the potential to affect the social and economic conditions of communities and individuals.

The project would be located in Maricopa County and would border Pinal County. The goals, objectives, and policies set forth in the plans associated with these counties, along with plans for the city of Goodyear and the nearby city of Maricopa, are related to social and economic considerations.

## 3.18.2 Analysis Area

The analysis area for this project includes the communities of Goodyear and Maricopa, as well as Maricopa and Pinal Counties. Mobile, Arizona, is a very small community located near the south end of the analysis area. Mobile is not incorporated and is now within the annexed portion of the city of Goodyear (City 2007). Additionally, there are scarce data available for Mobile; as such, this community is not addressed individually in this analysis. It is also important to note that the city of Maricopa was not incorporated until 2003; thus, there are no data for this locality prior to 2003. This analysis focuses on the populations closest to the project area and includes a broad cross section of demographics in which the project is situated (Figure 3-25). The data presented for state and county demographics are used for comparison purposes.

The overall demographics, economy, and quality of life in the analysis area have changed dramatically as the state's population has seen explosive growth. In 1990, Arizona was the second fastest-growing state in the United States, as the population grew from roughly 750,000 people in 1950 to more than 3 million in 1990 (Berman 1998). This explosive growth has altered the local landscape in terms of land use patterns, housing, employment composition, and transportation patterns. The historic and unprecedented growth in Arizona's population and economy changed between 2007 and 2009 during the national recession and beyond. During this time, growth slowed considerably. Maricopa County covers more than 9,000 square miles in central Arizona. Of the county's land area, the majority is either privately or federally owned: 29% is under private ownership, 28% is owned by the BLM, and 11% is owned by the Forest Service (Arizona Department of Commerce [ADOC] 2010). Another 11% is controlled by the State (ADOC 2010). Alternatively, land ownership in Pinal County, which covers 5,374 square miles, is dominated by ASLD (35%), followed by private ownership (22%) and tribal land (23%). The Forest Service and BLM collectively own 14% (ADOC 2009a).

## 3.18.3 Population and Demographics

Arizona has experienced substantial population growth over the past 20 years, with a 70.4% increase in the resident population between 1990 and 2010 (Table 3-26). Although that growth slowed between 2000 and 2010, there was still a 21.8% increase in the state's population. Maricopa County's growth for the same periods was in line with the state's population growth: 76.8% between 1990 and 2010, and 22.1% between 2000 and 2010. Pinal County's population growth between 1990 and 2010 was more than double

that of the state and Maricopa County, at 183%. The city of Goodyear grew by 941.5%, from 6,258 people in 1990 to more than 65,000 in 2010 (Census Bureau 2010). Growth in the city of Maricopa since it became incorporated in 2003 has been explosive, increasing by more than 3,200% over a 10-year period, with further rapid growth expected over the next decade (see Table 3-26) (ADOC 2009a–c, 2010; Census Bureau 2010; City of Maricopa 2006).

**Table 3-26.** Population Trends for the Sonoran Valley Parkway Project Analysis Area, 1990–2020

| Location | 1990 | 2000 | 2010 | 2020* | % Change 1990–2010 | % Change 2000–2010 | % Change 2010–2020 |
|---|---|---|---|---|---|---|---|
| ***Cities*** | | | | | | | |
| Goodyear | 6,258 | 18,911 | 65,178 | 162,000 | 941.5 | 244.6 | 148.5 |
| Maricopa | N/A | 1,040 | 34,809 | 190,000 | – | 3,247.0 | 445.8 |
| ***Counties*** | | | | | | | |
| Maricopa | 2,122,101 | 3,072,149 | 3,751,410 | 4,506,900 | 76.8 | 22.1 | 20.1 |
| Pinal | 116,379 | 179,727 | 329,297 | 493,200 | 183.0 | 83.2 | 49.8 |
| ***State*** | | | | | | | |
| Arizona | 3,665,228 | 5,130,632 | 6,246,816 | 7,485,000 | 70.4 | 21.8 | 19.8 |

Sources: ADOC 2009b, 2009c; Census Bureau 2010; City of Maricopa 2006
* Forecasted Population Growth.

# 3.18.4 Economic Sectors and Employment

## *3.18.4.1 Economic Activity*

### *Income*

Per capita income is a measure of the average income that an individual receives in terms of his or her equal share of a locality's total income, that is, the monetary amount each resident would receive of the yearly income generated in the country if the annual city, county, or state income were divided evenly between each resident. Per capita income is usually reported in units of currency per year. Alternatively, median household income divides income distribution into two equal groups—half with income above the median, and half with income below the median. Median income is based on all households and families over 15 years old with an income; household income is often the combination of two income earners pooling the resources and should be distinguished from individual earnings (as in per capita income).

In 2010, per capita income in Maricopa County and the cities of Maricopa and Goodyear was in line with the state and nation (Table 3-27). Per capita income in Pinal County was 28% less than in Maricopa County. Median household income for Maricopa and Pinal Counties was in line with the state and national averages. Median household income in the cities of Goodyear and Maricopa was 50% and 30% higher than the state, respectively (see Table 3-27).

**Table 3-27.** Per Capita and Median Household Income by City and County, 2010

| Location | Per Capita | Median Household |
|---|---|---|
| ***Cities*** | | |
| Goodyear | $28,141 | $76,221 |
| Maricopa | $26,609 | $65,790 |

**Table 3-27.** Per Capita and Median Household Income by City and County, 2010 (Continued)

| Location | Per Capita | Median Household |
|---|---|---|
| ***Counties*** | | |
| Maricopa | $27,816 | $55,054 |
| Pinal | $21,716 | $51,310 |
| ***State/Country*** | | |
| Arizona | $25,680 | $50,448 |
| United States | $27,334 | $51,914 |

Source: Census Bureau (2010).

## *Cost of Living*

Although the city of Phoenix is not within the analysis area, the estimated cost of living in the city can be used as a proxy for the overall cost of living in Maricopa County, and to a lesser degree, Pinal County. In 2000, Phoenix was ranked as the fortieth most expensive metropolitan area in the United States; in 1990, Phoenix was ranked seventieth. In 1990, living costs were an estimated 2% above the national average, compared with those in 2000, estimated at 4.5% higher (Vest 2002).

An area's cost of living can be represented in the Cost of Living Index (COLI); a COLI is a theoretical pricing index that measures the relative cost of living over time and compares the difference in living costs between cities. The Bureau of Labor Statistics publishes the Consumer Expenditure Survey, which is used to evaluate the price data for categories such as housing, transportation, food, goods and services, and medical expenditures for cities and counties across each state. These expenditure categories are then weighted according to their overall importance in the average consumer's budget.

A Cost of Living Rate of 100 represents the state average. A number below 100 indicates that the city is less expensive than the state average, and anything above 100 indicates that it is more expensive than the state average. The 2010 COLI for Phoenix was 100.60; in 2000, it was 101.80 (Morrison Institute for Public Policy 2012).

## *Taxes and Revenues*

In 2012, Arizona ranks twenty-seventh in the United States in the Business Tax Climate Index in the context of corporate taxes, individual income taxes, sales taxes, unemployment insurance taxes, and taxes on residential and commercial property (State Tax Climate Index 2012). In comparison, California ranks forty-eighth, Nevada third, and Colorado sixteenth. Arizona has a tax climate that neither encourages nor discourages new business expansion and start-ups. The state does have luxury, estate, personal, and corporate income taxes. Only those revenues that are clearly and concisely reported by the state or federal government (i.e., property taxes, sales tax, etc.) were considered for the analysis. Revenue information was gathered for the county level.

## *Property Tax*

In general, revenue from primary property tax collections helps fund state and local government budgets in terms of local government operating budgets and school and fire districts. Counties can use their allocation of property taxes to fund Superior Court systems, Sheriff's departments, transportation projects, and emergency services.

In Arizona, the ratio of assessed valuation (percentage of market value) is 10% on residential properties and 25% on commercial properties (Arizona Tax Research Foundation 2009). By comparison, the ratio of assessed valuation on residential properties is 35% in Nevada and 100% in California. In FY 2012, the net property valuation for Maricopa County was $34.26 billion, and for Pinal County, it was $2.15 billion (Arizona Department of Revenue [ADOR] 2012). The State distributed $5.1 million to the City of Goodyear and $3.4 million to the City of Maricopa for the same period (ADOR 2012).

### *Housing Characteristics and Property Values*

The Rainbow Valley area is a generally rural area with some low-density residential properties near the north end of the proposed Parkway and near the south end at SR 238 near Mobile. In 2011, there were an estimated 1.6 million housing units in Maricopa County, 13.4% of which were vacant. In Pinal County, 20.5% were vacant, out of 118,826 units (Census Bureau 2011). Vacancy in the cities of Goodyear and Maricopa were generally consistent with the counties (Table 3-28). Median home value was over $181,000 in the city of Goodyear and Maricopa County, $124,900 in the city of Maricopa, and $119,000 in Pinal County.

Both in Goodyear and Maricopa County, property values peaked in 2006 and have steadily, but not dramatically, decreased at approximately the same pace as neighboring cities and the county. The percentage of distressed properties and foreclosures or bank-owned properties as a result of the general negative shift in the housing market affecting the entire nation, continues to occur throughout the county and state. In 2009, 2.4% of bank-owned houses in Maricopa County were located in the Rainbow Valley area, by 2011, this figure dropped to 1.9% and home foreclosures in Goodyear are occurring half as fast as compared to Maricopa County (City 2012).

Initially, the Parkway concept originated to provide direct access from southern Goodyear to new proposed development within the annexed Sonoran Valley, however, with the economic downturn, plans for residential and commercial development were halted. This real estate trend occurred throughout metropolitan Phoenix and the nation during 2005 to 2009. Current trends within Goodyear indicate that the housing market is improving, though continuing to reflect a distressed realty market. Single-family housing building permits submitted to the City generally decreased from 2,758 at its peak in 2005, to 511 at its nadir in 2010, with a slight uptick in 2011 to 594.

**Table 3-28.** Housing Characteristics in the Analysis Area, 2010 and 2011

| Location | Total Units* | Occupied (%)* | Median Value† |
|---|---|---|---|
| ***Cities*** | | | |
| Goodyear | 21,077 | 18,217 (86.4) | $181,300 |
| Maricopa | 16,534 | 12,822 (77.5) | $124,900 |
| ***Counties*** | | | |
| Maricopa | 1,596,165 | 1,382,002 (86.6) | $181,600 |
| Pinal | 149,504 | 118,826 (79.5) | $119,400 |
| ***State*** | | | |
| Arizona | 2,776,037 | 2,326,468 (83.8) | $169,500 |

* Census Bureau (2010).
† Census Bureau ACS (2011).

## Economics Related To Recreation

Common social trends in the western United States include rapidly growing urban populations, increased concern over loss of open space, increasingly transformed landscapes, continued and increasing loss of biodiversity, increased pressures for uses of all types (in particular, strong trends in recreational uses, such as hiking, biking, OHV and sport utility vehicle [SUV] use, camping, picnicking, etc.), increased pressures for preservation and conservation, and increased feelings of loss associated with public and private lands, including lost access to public lands and recreation.

Although economic conditions are changing in the communities within and surrounding the analysis area, public land resources continue to be perceived as linked to local economic well-being. The scenic resources, climate, and outdoor opportunities in the region attract retirees and those looking for second homes. Some residents in the surrounding communities perceive BLM lands as being critical to their economy by providing hunting, fishing, wildlife, and recreational trails and a direct link to the local tourism industry.

Recreation and tourism are important contributors to the economic stability of the local area; economic benefits are derived from direct spending on food, gas, lodging, etc., but also from sales tax generated from visitor spending. Local and sales tax revenue is extremely important in rural (or non-urban) areas. This is because tourism often forms a larger proportion of the economic activity in these areas and also because special excise taxes on tourists and visitors (i.e., from food, lodging, auto rentals, etc.) are more heavily paid by visitors, rather than residents (Dean Runyan 2006). OHV use and camping (both dispersed and developed), along with hunting and fishing, stimulate the economy through direct local expenditures on motorized vehicles, trailers, equipment and accessories, and insurance and maintenance costs (Arizona State Parks 2003). Local spending on food, gas, lodging, and souvenirs also indirectly benefits the region by supporting wages and income in the local economy, as well as contributing local and state tax dollar revenue.

Population growth in Arizona is partially attributed to the state's appeal as a year-round recreational destination that offers diverse opportunities for outdoor recreational activities including wildlife watching, birding, nature photography, hiking, biking, camping, off-highway vehicle use, equestrian activities, and hunting. In 2005, Maricopa County had nearly $11.2 billion in travel-generated earnings, while Pinal County had about $507.4 million, and the state total was over $18.3 billion (Arizona Office of Tourism 2012). Travel-generated tax revenue is the state's highest generator (retail comes in second) (Arizona Office of Tourism 2012).

AGFD has undertaken studies to quantify the economics of consumptive and nonconsumptive wildlife recreation (AGFD 2002; Southwick 2003). Table 3-29 below describes the annual consumptive (angling and hunting) expenditures in Maricopa and Pinal Counties. Table 3-30 describes the economics of consumptive and nonconsumptive wildlife recreation in Maricopa and Pinal Counties.

**Table 3-29.** Angler and Hunter Expenditures, Maricopa and Pinal Counties

| Expenditures | Maricopa County | Pinal County |
|---|---|---|
| Trip Expenditures | $141,350,773 | $11,361,494 |
| Equipment Expenditures | $267,679,695 | $8,499,312 |

Source: AGFD (2002).

**Table 3-30.** Economic Impacts from All Watchable Wildlife Recreation in 2001

| Expenditures* | Maricopa County | Pinal County |
|---|---|---|
| Number of full- and part-time jobs | 6,603 | 949 |
| Retail sales | $368,334,416 | $50,897,041 |
| Salaries and wages | $192,817,949 | $26,614,902 |
| State sales and fuel tax revenues | $20,968,707 | $2,911,907 |
| State income tax revenues | $4,846,347 | $665,331 |
| Federal income tax revenues | $33,868,552 | $4,638,383 |

Source: Southwick (2003).
* Expenditures include County residents, residents from other counties, and non-residents.

Trip expenditures include but are not limited to purchases such as food, lodging, gas, equipment rental, ammunition, and use/access fees. Equipment expenditures include but are not limited to fishing gear, camping equipment, clothing, guns and rifles, and vehicle purchases.

Economic impacts in the analysis area from all watchable wildlife recreation generated approximately $400 million in retail sales in 2001, supporting nearly 8,000 jobs. The total tax revenue from all watchable wildlife recreation of the analysis area was approximately $65 million in 2001.

As illustrated in Tables 3-29 and 3-30, the economic benefits of consumptive and nonconsumptive recreation in Maricopa and Pinal Counties is a multimillion-dollar economy that supports thousands of jobs. At a more local level, revenue generated directly from visitor spending is more difficult to quantify, however, several recreational destinations are located within or adjacent to the area of analysis (e.g., SDNM) and would draw a variety of recreationists to the area.

Specific information regarding economic generation in areas smaller than the county level does not exist for this area. In addition, revenue-generating recreational activities that have required fees do not occur within the analysis area.

### *Economics Related to Livestock Grazing*

As stated in Section 3.12, Livestock Grazing, the proposed SVPP ROW, under all action alternatives and sub-alternatives, would intersect two existing allotments. The actual year-long use on these two allotments varies from year to year, based on resource and livestock market conditions.

Livestock grazing, grazing authorizations, and livestock uses are measured in animal unit months (AUMs). The federal grazing fee is computed by using a 1966 base value of $1.23 per AUM for livestock grazing on public lands in Western states. The figure is then adjusted each year according to three factors: current private grazing land lease rates, beef cattle prices, and the cost of livestock production. In effect, the fee rises, falls, or stays the same based on market conditions, with livestock operators paying more when conditions are better and less when conditions have declined.

The federal grazing fee, which applies to federal lands in 16 Western states on public lands managed by the BLM and the Forest Service, is adjusted annually and is calculated by using a formula originally set by Congress in the Public Rangelands Improvement Act of 1978. Under this formula, as modified and extended by a presidential Executive Order issued in 1986, the grazing fee cannot fall below $1.35 per AUM; also, any fee increase or decrease cannot exceed 25% of the previous year's level. An AUM is the amount of dry forage required to sustain one "animal unit" for one month. In Arizona, BLM grazing

allotments are classified as perennial, ephemeral, or perennial-ephemeral. The grazing fee for 2013 is $1.35 per AUM.

The Beloat allotment is, in part, located on 101,111 acres of BLM land and typically has approximately 280 cattle for grazing. The Conley allotment is, in part, located on 91,018 acres of BLM land. Current (2013) AUMs for the Beloat and Conley allotments are being evaluated by the BLM Lower Sonoran Field Office. The 2012 SDNM RMP has resulted in closures to grazing in certain areas of the allotments effective in fall 2014, and new AUMs would be established upon the closures.

### 3.18.4.2 Employment

In 2010, total employment in the two cities of Goodyear and Maricopa was 43,335; it was 1.86 million in the two-county (Maricopa and Pinal) analysis area (Table 3-31). The total employment in Maricopa and Pinal Counties represented 68% of total state employment. In both cities, counties, and the state, the "education, health, and social services" sector was the top industry for employment in 2010. This industry accounts for 19% of employment in both counties and 20% in the cities of Maricopa and Goodyear (EPS 2012).

**Table 3-31.** Employment by City and County, 2010

| Industry | City | | County | | State |
|---|---|---|---|---|---|
| | Goodyear | Maricopa | Maricopa | Pinal | Arizona |
| Agriculture, forestry, fishing, hunting, mining | 157 | 303 | 9,568 | 3,977 | 36,905 |
| Construction | 2,069 | 1,304 | 156,130 | 12,691 | 244,026 |
| Manufacturing | 1,386 | 2,127 | 144,797 | 11,789 | 211,782 |
| Wholesale trade | 886 | 541 | 52,150 | 3,450 | 73,841 |
| Retail trade | 2,799 | 2,017 | 209,943 | 15,287 | 334,791 |
| Transportation | 2,216 | 1,189 | 88,940 | 7,035 | 136,251 |
| Information | 376 | 581 | 36,058 | 2,200 | 52,675 |
| Finance, insurance, real estate | 2,514 | 1,599 | 172,412 | 8,361 | 225,051 |
| Professional, scientific, management, administrative | 2,622 | 1,449 | 213,073 | 9,648 | 306,180 |
| Education, health, and social services | 5,844 | 3,272 | 334,926 | 25,061 | 562,284 |
| Arts, entertainment, recreation | 2,060 | 1,303 | 166,658 | 10,029 | 282,794 |
| Public administration | 1,876 | 1,202 | 74,971 | 10,588 | 151,134 |
| Other | 1,105 | 548 | 81,199 | 5,461 | 129,761 |
| **Total** | **25,910** | **17,435** | **1,740,825** | **125,577** | **2,747,475** |

Source: EPS (2012).

### 3.18.4.3 Unemployment

In terms of the annual unemployment rate in 2010, unemployment was lowest in the city of Goodyear, at 7%, and highest in the city of Maricopa, at 13%. Unemployment rates in Maricopa and Pinal Counties (9.6% and 11.70%, respectively) were similar to the state and national unemployment rates (10.5% and 9.6%, respectively) (Arizona Office of Employment and Population Statistics 2012).

## 3.18.5 Environmental Justice

This section identifies and describes the potential for environmental justice (EJ) impacts as a result of the construction and operation of the proposed Parkway. Environmental justice is defined as the fair treatment and meaningful involvement of all people—regardless of race, ethnicity, or income level—in environmental decision-making. EJ programs promote the protection of human health and the environment, empowerment by means of public participation, and the dissemination of relevant information to inform and educate affected communities. Consideration of EJ issues is mandated by EO 12898, which was published on February 11, 1994. This EO requires that all federal agencies incorporate EJ into their mission by "identifying and addressing…disproportionately high and adverse human health of environmental effects of [their] programs, policies and activities on minority and low-income populations in the United States" (EPA 1994).

The EPA defines a community with potential EJ populations as one that has a greater percentage of minority or low-income populations than does an identified reference community. Minority populations are those populations having 1) 50% minority population in the affected area or 2) a significantly greater minority population than the reference area (EPA 1994). The EPA has not specified what percentage of the population can be characterized as "significant" in order to define EJ populations. Therefore, for the purposes of this analysis, a conservative approach is used to identify potential EJ populations; it is assumed that if the affected area minority and/or poverty status populations are considerably higher than those of the reference area, there is likely an EJ population of concern. Low-income populations were defined as those individuals who are considered living below poverty levels. The Census Bureau defines poverty-level thresholds for individuals and a family of four as income levels below $11,170 and $23,050, respectively (Census Bureau 2012).

The methodology for this analysis included assessing the presence and percentage of minority and low-income populations in the area of analysis and determining whether those communities would experience disproportionately high and adverse impacts as a result of the proposed project. The Census Bureau data for 2010 at the state, county, municipal, and census-tract level were used to determine the presence of minority and low-income populations. By establishing a reference population from definable communities and determining whether higher concentrations of environmental justice populations exist within the area of analysis, any disproportionately high or adverse impacts are identified, analyzed, and disclosed herein.

The reference population was determined to be Goodyear and Maricopa. Both cities are located within the area of analysis and are adjacent to the proposed SVPP alternatives. By comparison, the city of Maricopa had the highest minority population, with 26.7%, followed by Pinal County (26.3%), whereas the city of Goodyear (18.5%) and Maricopa County (19.5%) were similar to the state (21.8%) (Table 3-32). Relevant ethnicity data for the census tracts were used to determine whether populations residing in the affected area constitute a potential EJ population. This was done by comparing minority statistics for the census tracts with those reported for Goodyear and Maricopa. The most current data available at the census tract level were from 2010.

A potential EJ population was determined to exist in the census tracts if the minority population (i.e., a non-white population) is considerably more, or exceeds 50%, than the minority population in one of the reference communities (Maricopa or Goodyear). Table 3-32 summarizes these proportions for census tracts within the area of analysis.

Sixteen census tracts encompass the area of analysis and are located within a 14-mile radius of the project area. The potential EJ populations located closest to the proposed Parkway are located between approximately 2 and 14 miles of the project area.

Minority population data for the state of Arizona, Maricopa and Pinal Counties, and the cities of Goodyear and Maricopa were obtained from the Census Bureau; the latest available data are from the 2010 census. For this analysis, a population is classified as "minority" based on all races and ethnicities that are not "white." Results of census-tract population trends show four census tracts with a higher concentration of minority populations (e.g., Hispanic or Latino and American Indian) representing over 50% of the total census-tract population. These census tracts are 7233.06, 9410, 9411, and 9413 (see Table 3-32).

**Table 3-32**. Minority Population by Race and Ethnicity, 2010

| Location | Total Population | White Alone | Hispanic Alone | Black or African American | American Indian | Asian | Native Hawaiian |
|---|---|---|---|---|---|---|---|
| ***Census Tracts*** | | | | | | | |
| Census Tract 7233.04 | 4,230 | 3,187 | 1,701 | 80 | 70 | 17 | 4 |
| Census Tract 7233.06* | 5,259 | 2,509 | 2,154 | 699 | 295 | 30 | 6 |
| Census Tract 9410* | 2,931 | 55 | 363 | 10 | 2,659 | 2 | 1 |
| Census Tract 9411* | 63 | 9 | 40 | 0 | 27 | 0 | 0 |
| Census Tract 9413* | 6,293 | 1,413 | 805 | 19 | 4,496 | 14 | 9 |
| Census Tract 17.01 | 1,087 | 723 | 411 | 24 | 72 | 22 | 0 |
| Census Tract 17.02 | 2,727 | 2,031 | 664 | 240 | 40 | 162 | 40 |
| Census Tract 17.03 | 2,001 | 1,389 | 630 | 132 | 61 | 52 | 4 |
| Census Tract 17.04 | 6,420 | 4,111 | 1,902 | 699 | 169 | 213 | 14 |
| Census Tract 17.05 | 7,209 | 5,659 | 1,502 | 542 | 167 | 267 | 15 |
| Census Tract 17.06 | 4,872 | 3,567 | 1,016 | 427 | 47 | 280 | 14 |
| Census Tract 17.07 | 5,070 | 3,243 | 1,301 | 618 | 125 | 348 | 17 |
| Census Tract 17.08 | 5,979 | 4,701 | 1,063 | 541 | 79 | 188 | 8 |
| Census Tract 17.09 | 2,738 | 1,818 | 682 | 301 | 44 | 145 | 5 |
| Census Tract 17.10 | 4,324 | 2,970 | 1,145 | 501 | 83 | 95 | 15 |
| Census Tract 17.11 | 2,157 | 1,459 | 706 | 212 | 60 | 51 | 6 |
| ***Cities*** | | | | | | | |
| Goodyear | 57,896 | 47,185 | 16,602 | 2,838 | 502 | 1,444 | 47 |
| Maricopa | 34,809 | 25,509 | 8,591 | 2,175 | 492 | 1,318 | 142 |
| ***Counties*** | | | | | | | |
| Maricopa | 3,751,410 | 3,018,608 | 1,087,987 | 170,642 | 58,074 | 122,090 | 7,134 |
| Pinal | 329,297 | 242,656 | 95,091 | 13,363 | 16,539 | 5,025 | 1,274 |
| ***State*** | | | | | | | |
| Arizona | 6,246,816 | 4,883,606 | 1,814,674 | 228,860 | 253,612 | 162,134 | 11,053 |

Source: Census Bureau (2010).

* Gray highlight indicates the percentage of the population below the poverty level is higher than the reference populations

Low-income populations in an affected area are populations below the annual statistical poverty thresholds published by the Census Bureau's current population reports on income and poverty. Families and persons are classified by the Census Bureau as below poverty level if their total family income or unrelated individual income is less than the poverty threshold specified for the applicable

family size, age, and number of related children under 18 years of age. Poverty status is determined for all families (and, by implication, all family members). For persons not in families, poverty status is determined by their income in relation to the appropriate poverty threshold. Thus, two unrelated individuals living together may not have the same poverty status. According to the 2010 Census, 15.3% of individuals in Arizona live below the federal poverty level. The percentage of individuals living below the federal poverty level in Maricopa and Pinal Counties was 13.9% and 13.5%, respectively. The percentage of individuals living below the federal poverty level in the cities of Goodyear and Maricopa was 7.5% and 5.6%, respectively. Nationwide, 13.8% of individuals live below the federal poverty level. Within the selected census tracts that compose the area of analysis, four census tracts reported a percentage of the population below the poverty level higher than the reference populations. These census tracts are 7233.04, 9410, 9413, and 17.08 and are identified in Table 3-32 and Table 3-33 by gray highlights (Census Bureau 2010).

**Table 3-33**. Low-income Population by Area, 2010

| Location | Population Below Poverty Level | Population Below Poverty Level (%) |
|---|---|---|
| ***Census Tracts*** | | |
| Census Tract 7233.04 | 763 | 20.4 |
| Census Tract 7233.06 | 0 | 0.0 |
| Census Tract 9410 | 1,645 | 65.5 |
| Census Tract 9411 | 0 | 0.0 |
| Census Tract 9413 | 1,770 | 26.2 |
| Census Tract 17.01 | 4 | 0.6 |
| Census Tract 17.02 | 54 | 2.2 |
| Census Tract 17.03 | 0 | 0.0 |
| Census Tract 17.04 | 219 | 3.5 |
| Census Tract 17.05 | 184 | 2.9 |
| Census Tract 17.06 | 84 | 2.0 |
| Census Tract 17.07 | 20 | 0.5 |
| Census Tract 17.08 | 915 | 18.3 |
| Census Tract 17.09 | 139 | 6.9 |
| Census Tract 17.10 | 81 | 2.1 |
| Census Tract 17.11 | 10 | 0.5 |
| ***Cities*** | | |
| Goodyear | 4,614 | 7.0 |
| Maricopa | 2,086 | 4.7 |
| ***Counties*** | | |
| Maricopa | 664,966 | 17.4 |
| Pinal | 61,458 | 17.1 |
| ***State*** | | |
| Arizona | 1,203,501 | 19.0 |

## 3.18.6 Quality of Life

Increased regional growth over the past several decades has been a significant driving force in the current social and economic setting of the area. As previously noted, explosive population growth has "altered local land, housing, and labor markets; transportation patterns, accessibility to open space, riparian habitats; and other aspects of the human, built, and natural environments of central Arizona" (Gober 1998:30). Growth in the region has exerted some pressure on undeveloped federal lands as residential and commercial developments move closer to the fringe. The areas immediately north of the proposed Sonoran Valley Parkway (in the city of Goodyear) and at the south end the proposed Sonoran Valley Parkway (near Mobile) are largely undeveloped areas with potential for future residential growth as a result of the availability of some private lands.

Although current population and development in the immediate vicinity of the action alternatives is relatively sparse, Rainbow Valley and the SDNM do provide dispersed recreation opportunities such as hiking, hunting, sightseeing, rock collecting, and OHV use (BLM 1988). Rainbow Valley stretches between the cities of Goodyear and Maricopa and is a largely undeveloped area with a patchwork of agricultural fields and undisturbed desert. The SDNM, which is located southwest of all the action alternatives, has been noted for lands that exhibit a high degree of naturalness and for providing outstanding opportunities for visitors to experience solitude and primitive, unconfined recreation. Although the cities of Goodyear and Maricopa are not tourism or recreation destinations per se, they do provide access points to the SDNM and BLM lands in the region. The undeveloped nature of the project area amid rapid regional growth and its proximity to the SDNM define the quality of life and nature of the analysis area.